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ABSTRACT

This paper deals with the need to redefine and comprehensively restructure teacher education programs, emphasizing what teachers can best learn, in what contexts, and at what stages of their cognitive and social development as professionals. The report is organized into 5 parts: Part 1 concentrates on what schools should do that they are not doing, or not doing well enough, and why the education of teachers is essential to improve what and how children learn. Part 2 examines several trends in school reform. Part 3 provides an overview of the fundamental problems with current goals and roles of schools of education. Part 4 identifies and evaluates current proposals for improving conventional approaches to teacher preparation. Part 5 proposes a set of policies and practices for educating teachers which could increase the effectiveness of teachers as well as their capacity and motivation to continually increase their effectiveness. Conclusions reached in the report are based on an analysis of several hundred empirical research studies. Appendixes provide a scenario of what the teacher preparation internship in Pennsylvania might look like and a proposed experimental program for supporting the professional development of beginning teachers and their mentors. (Contains approximately 150 references.) (LL)

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Re-Visioning Teacher Education in Pennsylvania

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A policy study
prepared for

The Pennsylvania Academy for
the Profession of Teaching

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RE-VISIONING TEACHER EDUCATION

IN PENNSYLVANIA

INTRODUCTION

The Need for Systemic and Radical Change in the Ways We Educate Our Teachers

The history of reform in teacher education is one of increased expectations for beginning teacher competence and increased time invested in preservice preparation in departments, colleges, and schools of education. In the last several years, there have been significant improvements in the rigor and quality of the preservice curriculum, increased sophistication of teacher educators, more effective structuring of more extensive preservice field experiences, and higher standards for teacher certification. Despite these changes, teacher education continues to be seen as a big part of the problem in American education and to be the focus of hopes that we can "turn things around" in our schools.

If one looks to other highly developed nations, one sees teacher education that looks a lot like teacher education in the United States, both with respect to core processes and the level of dissatisfaction about the contributions made to effective teaching.

There must be something to be learned from world-wide conditions. We conclude that the central lesson is that we need to go back to the drawing board and "re-vision" the education of teachers and redefine and comprehensively restructure the processes by which teachers learn to teach. Moreover, we conclude, as do increasing numbers of those who have pondered why educational reform is seldom matched by big changes in student learning, that the redefinition and restructuring of the education of teachers should be "systemic." A systemic approach to substantially improving the education of teachers would focus on the question: what can teachers best learn, in what contexts, and at what stages of their cognitive and social development as professionals?

Overview of Report

The question of how, where, and when teachers can best develop their knowledge and skills focuses on the processes of facilitating teacher learning. Re-visioning of the education of teachers must also engage two more fundamental questions. First, what should our schools do that they are not doing, or not doing well enough? And, second, why is the education of teachers essential to the substantial improvements in what and how children learn? Part I of this Report addresses these two questions and our answers to them are, in effect, some of the central reasons why re-visioning--developing a very different understanding of how best to educate teachers--rather than reforming teacher education is important.

In Part II of this Report, we examine several trends in school reform that do not directly focus on the professional development of teachers and how federal policies relating to teaching and the education of teachers are likely to affect what and how teachers learn.

Part III of this Report provides an overview of the fundamental problems with the current goals and roles of the institutions involved in the education of teachers.

Of course, efforts to substantially change ways we educate our teachers and how we allocate the investments we make in efforts to improve schools will not take place in a vacuum. We are not starting over; an elaborate set of processes are already in place that have their advocates and their justifications. Thus, in Part IV of this Report, we identify several current proposals for improving conventional approaches to teacher preparation and critically evaluate these reform strategies. In this part of the Report, we provide a basis for concluding that building upon the current processes for teacher preparation is a limited and limiting strategy for improving schools. At the same time, in order to make this Report as useful as possible to policy makers and others interested in the reform of teacher preparation, we point out not only the weaknesses but the strengths of proposals to improve conventional approaches to preparing teachers. We conclude Part IV by identifying those improvement strategies that, if implemented, would enhance the quality and influence all of teacher education in Pennsylvania.

In Part V of this Report, we propose a set of policies and practices for educating teachers--which we call re-visioning--which should increase the effectiveness of teachers as well as their capacity and motivation to continually increase their effectiveness. Our goal in Part V is to provide the justification for a developmentally-oriented system of learning opportunities for teachers that will facilitate significant improvements in what and how children learn and to describe what that system would look like. The system we propose would, as we have implied, change both the processes and expected outcomes of the learning opportunities teachers have throughout their preprofessional and professional lives. If this system is to work, it must clarify the roles and responsibilities of the different sources of teacher learning and ways must be developed by which the effectiveness of these sources can be evaluated and institutions held accountable. Thus, we develop, in some detail, suggestions about what should be expected of preservice teacher preparation and ways to know whether these expectations are being met.

Many of the proposals we make in this final part of the Report can be found, in some form, elsewhere in the nation and in some places in Pennsylvania. We refer to these experiments as we proceed.

Methodology

The conclusions reached in this report are based on our analysis of several hundred research studies covering a broad range of topics. These empirical studies deal with changing economic and social conditions, student and teacher learning, teaching effectiveness, school reform, organizational change, and, of course, preservice and inservice teacher education. In addition, we reviewed a number of reports by national and state organizations advocating particular changes in schools and the education of teachers, examined existing and proposed policies aimed at improving the education of teachers, and interviewed representatives of different interests concerned with the education of teachers.

This study seeks to serve the people of Pennsylvania. Thus, we sought to learn--from documents and interviews--what we could about the educational needs of the state and what those who influence the education of teachers think should be done. In addition, we (1) reviewed over 50 recent articles and reports on Pennsylvania education listed in electronic data bases and (2) read every article on Pennsylvania published in Education Week since mid-1992.

The more we have learned about Pennsylvania, the more we have come to believe that the directions the state should take in improving the education of teachers are similar to those that need to be taken throughout the nation. This is not to say that Pennsylvania is like other states in all ways important to the education of teachers. For example, as we note next, the supply of teachers in the state seems to meet the demand in virtually all school districts. But, most of the differences among states related to teaching are differences of degree rather than kind. These differences relate mainly to problems of implementing changes and to the political considerations involved in improving teacher education. This Report gives priority to reforms in schools that recognize the inevitable interdependence of teacher learning and student learning. We do not speculate about these political considerations for two reasons. First, we do not know enough about the different stakeholders in teacher education reform in Pennsylvania to make informed judgments. Second, the usefulness of political and institutional analyses of particular situations depends on how different actors respond initially to new proposals. While the system we urge Pennsylvania to consider is ambitious, it both giveth and taketh away. That is, while it would change roles and responsibilities of different institutions, on balance, it would give all of them important things to do that they need to do and can be good at doing. Or so it seems from our distant view.

PART I

BASIC GOALS OF EDUCATION:
THE ECONOMIC AND DEMOGRAPHIC CONTEXT AND THEORIES OF LEARNING

We start with the assumption that the primary reason for caring about and investing in the education of teachers is to ensure that all children are well educated. It follows that what we want teachers to know and be able to do should be driven by what we want children to know and be able to do and by an understanding of the processes most likely to facilitate student learning. The processes for facilitating learning should be shaped by the characteristics of our students and by knowledge of how students, and educators, learn.

All of the key concerns upon which the redesign of a comprehensive approach to educating teachers should be built--goals, the demography of our schools, and theories of learning--are undergoing dramatic changes.

The Goals of Education

Throughout time and in all nations, the goals that schools should help students achieve have been called into question. In the United States, there appears to be some agreement that the six "National Goals for Education" spelled out by the President and the nation's Governors in 1990 are important and desirable. So, let us stipulate that efforts to re-vision and reinvent schools should be built upon the structural characteristics of schools that are essential for maximizing the capacity and opportunities students have to learn any of the subjects listed in the National Goals and that our schools should seek to achieve those conditions for facilitating learning that the Goals specify.

It seems reasonable to believe, however, that the National Goals were conceived in the context of the vision of schools we have had in our national consciousness for some time, and that they are likely to be pursued by trying to do better what educators have been doing.

It remains to be seen whether efforts to achieve the National Goals often lead to questioning the assumptions about curricula and student learning that have dominated thinking about schools over the last several years. Indeed, a good many of the nation's schools already attain all or most of the National Goals, at least in terms of conventional criteria for measuring school performance.

It seems important to emphasize that even if schools were able to substantially increase their students' knowledge of the subjects covered in state curriculum guidelines or to improve students' abilities to perform the technical aspects of mathematics and communication, schools would still fall short of what is needed to ensure the welfare of individuals and the nation. The nature of tasks related to economic productivity and democratic citizenship, as well as life as members of a family or a community, are becoming increasingly complex. Those individuals, groups, organizations, and nations that will realize their full potential in the future will be those best able to deal with complexity and uncertainty.

It is important to recognize that the changes in the economic and social complexity with which all students should be prepared to deal are nonincremental. In the next few pages we illustrate this reality by focusing on how changes in human capital--i.e., the capabilities of the workforce--are tied to the prospects of economic prosperity for individuals and the society. We realize that this focus may offend those who assert that we should not justify investments in education in economic terms. We agree that economic justifications are not the only reasons for having quality schools. However, the changes in the sources of economic productivity lead to a need for educational outcomes that coincide with the most humanistic and democratic goals of education.

The U.S. and Pennsylvania Economies: Trends and Implications

U.S. Economic Trends

American workers in the year 2000 will face an economy that reflects the effects of a number of major current demographic and economic trends.

- American industry will face stiff competition from our international trading partners as the global economy continues to emerge.
- The rate of growth of the American labor force will continue its decline.
- The U.S. population will continue to "age"; that is, as the Baby Boomer cohort ages, the U.S. population will contain higher proportions of older persons.
- As the two previous trends converge, a labor force will emerge in which each worker will support a growing number of persons who are not in the workforce.
- The U.S. labor force will reflect larger proportions of minorities, women, and immigrants--groups which have traditionally been difficult to train, hard to employ, and consequently underutilized.
- The U.S. economy will continue its structural shift from an industrial basis to a service basis.
- High-performance work organizations will continue to emerge in which work is flexible, problem-oriented, and collaborative, in contrast to the traditional work place in which work is repetitive, routinized, and organized hierarchically.
- The job market will continue to evolve such that, on average, newly created jobs will be associated with higher technology occupations and will require higher entry-level skills.

The Pennsylvania Economy

Each of these national economic trends will be reflected as well in the Pennsylvania economy at the end of the decade. The following state projections have major implications for the schooling that the Commonwealth must provide to its citizens in order to enable them to meet the demands and challenges of a twenty-first century economy.

Workforce Characteristics in Pennsylvania. The population of Pennsylvania is projected to grow by 1.3 percent during the current decade to a total of 12,081,000 by the year 2000[1]. The state has seen a shift in its population away from urban centers to suburban and rural areas since 1970, with the greatest growth noted in the central and southeastern regions. Along with that of the rest of the nation, the population of the state will also continue to "age"; for example, the 40-49 age cohort will see a 60 percent increase, the 80+ cohort will increase by nearly 80 percent, while the 20-29 age cohort will decrease by over 30 percent. (In fact, the state ranks second only to Florida in the percentage of its population age 65 and over). This means that the median age of the state's workforce will rise from 36.3 in 1980 to 39.8 years in the year 2000.

The working age population will increase by only 383,000 during the decade, as compared to a 1.3 million increase during the previous 20 years. The Pennsylvania labor represents a marked decline in the labor force growth rate compared to that of the previous two decades (9.5 percent increase from 1970-1980 and 12.5 percent increase from 1980-1990). As a result, fewer freshly trained youth will be available for the new and emerging force which is expected only to grow at a rate of only 3.3 percent for the 1990-2000 decade. Thus technical occupations will be more dependent on retraining older workers. Some have even suggested that the potential exists for an undersupply of workers in the state by the end of the decade.

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[1] The data presented in this section are derived from several sources: Pennsylvania Business Roundtable, 1991 annual report; Pennsylvania Business Roundtable, The competitive position of Pennsylvania businesses: 1992 update; Pennsylvania Business Roundtable, Suggested action plan for business/education cooperation in Pennsylvania, 1990. Pennsylvania Department of Education, Commonwealth of Pennsylvania state plan for vocational and applied technology education, 1991-1994. Pennsylvania Economic Development Partnership Board, Investment in Pennsylvania's future: The keystone for economic growth, 1988.

With respect to other changes in the composition of the workforce, Pennsylvania has seen a significant increase in the number and proportion of women in the workforce. The labor force participation rate of women (the proportion of the female population 16 years old and over in the labor force) is projected to increase from 46.0 percent in 1980 to 56.5 percent in 2000. Moreover, women will constitute 48.0 percent of the labor force by 2000, up from 41.2 percent in 1980. The Pennsylvania workforce is also projected to see an increase in the proportion of nonwhites from 8.8 percent in 1980 to 9.9 percent in 2000.

Economic Growth and Jobs. During the 1980s the Pennsylvania economy grew modestly and generally more slowly than the national economy. The gross state product increased by 26 percent in (1982 dollars) between 1977 and 1989, while the national economy grew by over 40 percent.

Pennsylvania is expected to see an increase in the total volume of jobs by 500,000 from 1985-2000. When this is combined with the projected decrease in the rate of growth of the labor force, the state should experience a substantial reduction in the average unemployment rate from 8.0 percent in 1985 to 5.2 percent in 2000. The picture is unclear for minorities, however. Employers could reach out to historically disadvantaged groups for workers in the face of a shrinking labor pool. Yet, job growth in advanced technology occupations is expected to occur outside central cities, where minorities tend to be concentrated. Thus, there is no assurance that these new jobs will absorb higher proportions of minorities.

Consistent with the shifts in the national economy, the Pennsylvania economy has experienced a steady structural shift from heavy industry/manufacturing jobs to white collar and service occupations. During the decade 1985-1995, the state is projected to experience a loss in manufacturing employment of 12.5 percent, while non-manufacturing employment is projected to increase by 13.7 percent. This will result in a net gain of 360,900 jobs (or a 7.7 percent increase). Job losses in the manufacturing sector will result from continued declines in the durable goods industries (especially the primary metals) and the textile industry, while in the non-manufacturing sector, job losses of 7.4 percent are anticipated in mining. Large gains in employment are projected in health services and business services. In fact, fifteen of the state's top 27 fastest growing occupations are in the health or computer field. Employment increases are also expected in retail and wholesale trade, construction, finance, insurance, and real estate.

Two major occupational groupings are projected to increase faster than average for all occupations and will employ the largest proportion of workers required to have a college education or specialized post secondary training. From 1985-1995, professional, technical, and related occupations will increase by 135,700 jobs (16.7 percent increase), while managerial and management related occupations will increase by 58,000 jobs (12.8 percent increase). Many of these occupations will be in high-performance workplaces, requiring employees who can problem-solve, think creatively, and work collaboratively.

Moreover, most of the new and emerging occupations are "technology intensive." Workers who enter these occupations will be required to have a strong academic background, especially in math, science, and communications. Over 40 percent of all new jobs will require education and training that is heavily academic (versus traditional vocational-technical training). While only 20 percent of jobs will require a college degree, most of the remaining 80 percent will require some post-secondary education.

Pennsylvania ranks eleventh among the 50 states in per student expenditures. At the same time, per capita income in Pennsylvania is somewhat below the average for all states and the proportion of households with school-age children is among the lowest. The good news here appears to be that the people of Pennsylvania give relatively substantial support to public education although this varies widely throughout the state. The bad news--and a challenge for the education of teachers--is that it may be difficult to sustain public support, especially if economic growth rates do not increase. This is likely even though the level of tax effort for Pennsylvania is somewhat below the national average (Lausberg, 1991), in part because the local revenues--which are vulnerable to loss of public support--account for a larger percentage of the total cost of public education than in all but 14 other states (Lausberg, 1991).

Implications for What Students Need To Know and Be Able To Do

Like the national economy, the Pennsylvania economy of the year 2000 will be characterized by a demand for more highly-skilled workers who are able to function in workplaces of increasing sophistication and complexity. At the national level, most new occupations will require relatively high levels of academic preparation and technical literacy. Many leaders in government, business, and industry have thus seized on the issue of educational quality as the key to ensuring the nation's economic health in the long run. Marshall and Tucker (1992) argue, for example, that productivity and competitiveness of the United States depends on both the skills of the workforce and the capacity to effectively use highly educated and trained people in the workplace. Moreover, they argue that national and state policies related to economic development and education--or human resource development--should be treated as integral parts of a comprehensive strategy.

In an attempt to articulate such a strategy, the Pennsylvania Business Roundtable (1991) noted in a recent report that the state's education system must prepare students to join the workforce with the following sets of skills: basic skills (reading, writing, computation); communication skills (listening, oral, and written); creative thinking and problem-solving skills (flexibility, adaptability); personal management skills (motivation, goal setting, career development); interpersonal/collaborative skills (negotiation, team work); and leadership skills.

These competencies are similar to those identified by the U.S. Department of Labor as characteristic of the "expert worker of tomorrow" (SCANS, 1991). According to SCANS, the competent worker will be able to demonstrate skill in managing or using: (1) resources (time, funds, space, staff); (2) interpersonal skills (team work, teaching, negotiating, initiative); (3) information (both quantitative and qualitative from diverse sources); (4) systems (understanding of their work context--i.e., its various parts and interconnections--and of ways to monitor and correct their own performance); (5) technology (use and maintenance). As noted in the SCANS report, these competencies are undergirded by a three-part foundation of intellectual skills and personal qualities, including (1) basic skills (reading writing, mathematics, listening, and speaking; (2) thinking skills (creative thinking, problem-solving, decision-making, reasoning, knowing how to learn); and (3) personal qualities (self-esteem, sociability, self-management, individual responsibility, and integrity). Schools must therefore continue to fulfill their traditional function of imparting basic academic and social skills to students while simultaneously providing them with the higher-level thinking, problem-solving, technical, and teamwork skills necessary to survive and flourish in the economy of the twenty-first century.

Higher Order Learning For All Children

The ability to engage in more sophisticated intellectual tasks and to learn with and from others can be thought of as the product of higher order learning. The definition and importance of higher order learning have been elegantly and succinctly articulated by the Council of Chief State School Officers (1990):

> [Higher order learning] is complex; yields multiple criteria; involves uncertainty and finding structure in apparent disorder; demands self-regulation of thinking processes; and requires considerable mental effort. ...The elements of higher order learning are not new. They represent timeless, longstanding concepts of learning never realized universally but only by small fractions of the population. What differs at the close of this century is that education for higher order learning is essential for all (p. 3).

There is an ongoing debate among labor economists about just how fast the demand for persons with higher order learning skills is growing and about the proportion of jobs that will demand such skills. One reason for this uncertainty is that technological change and job design are shaped by the human capital available. So, the design of jobs is "dumbed down" in some cases for fear that able people could not be found to fill more complex roles. In any event, every analyst agrees that those who have the capacity and motivation to engage in higher order learning will be those who hold the most productive, best paid and most influential jobs (Marshall & Tucker, 1992; SCANS, 1992; Reich, 1991). Thus, if our schools are to provide equal educational opportunity, they must ensure that all schools develop in all students the capacity for higher order learning

As we noted earlier, the capabilities to engage in complex problem-solving and to work well with and learn from other people are not only important for economic reasons, they are essential competencies for democratic citizenship. The nation did not, however, design its schools or educate its teachers to develop such strengths. As the Council of Chief State School Officers (1990) asserts:

> Schools, previously asked to ensure the development of basic skills, are now required to teach all students a new, broad range of cognitive skills demanded by the changing contexts in which students live. This new demand on schools is nothing less than a call for the democratization of thinking (p. 2).

Changing Demographics--Who Will the Schools Serve?

While economic changes have been redefining what we need children to learn in school, a second set of developments have created unprecedented challenges for our schools. Both nationally and in Pennsylvania, the combination of increasing poverty and diminishing incomes for the working class, inadequate social policies affecting children, family and community disorganization, and massive immigration, have yielded a population of children and youth who make new and greater demands on educational practices and structures that were developed in less complicated times. The children in today's schools are more diverse racially, ethnically, and socioeconomically than ever before. Moreover, increasing proportions of school children have special needs related to second and third generation poverty, limited English-language proficiency, family problems, community disorganization, and physical and mental handicaps. Indeed, virtually every socioeconomic indicator associated with student achievement moved downward in the 1980s (Ferderer, 1991). Things that once worked in many schools now don't.

Pennsylvania's students are not as racially and ethnically diverse as those in other very populous states. However, black and Hispanic students represented over 15 percent of the student cohort and their numbers are increasing (Study Team on Teacher Preparation, 1988). The vast majority of these students live in relatively low-income households. While the population of black and Hispanic students is growing, the proportion of black and Hispanic teachers is only seven percent of all teachers. In 1988 only 100 black students applied for teacher certification (Study Team on Teacher Preparation, 1988).

As in other parts of the country, the achievement levels of black students in Pennsylvania lag far behind the achievement levels of white students. And, the relationship between poverty and student performance is very high, both in Pennsylvania and in the nation (Cooley, 1990; Mullis, et al., 1991). As Cooley (1993) has recently pointed out, Pennsylvania's districts differ widely in the "difficulty of educational task" they confront. And the differences among districts in this respect appears to be widening.

The increasing diversity of the students in our schools means that teachers must learn new ways of facilitating student learning. This challenge is made all the greater by growing evidence that traditional strategies for managing diversity--like tracking, pull-out remedial programs, retention, and assignment of "slower" students to classes for the learning disabled--either don't work or are counterproductive for most students (Braddock & Slavin, 1993; Oakes, Gamoran & Page, 1992).

The increasing diversity of the student population seems related to persistent and seemingly greater demands for giving parents greater choice in the schools their children attend and one might see this as portending a shift from public to private education. We think not. In fact, there has been little growth in private education in recent years. In Pennsylvania, 13 percent of students attend private schools, a proportion only slightly higher than the nation as a whole. However, the diversity of students does have political implications because the possibilities of discrimination and self-imposed ethnic, racial, and religious separation increase. The confidence among parents and policy makers that teachers can cope with this diversity in ways that benefit all children is likely to influence support for education. This has implications for teacher training.

While the proportion of students attending private schools is not unusual, the proportion of families with children in Pennsylvania public schools is low compared to most states and the proportion of elderly persons is high (Strauss, 1992). These facts, coupled with the growing diversity of the students in Pennsylvania, may mean that educators, and especially teachers, must develop the capacity to help all Pennsylvanians understand why high achievement for all children is important to Pennsylvania's children. In other words, teachers must also take the lead in educating the public if children are to have the opportunity to be all that they can be.

Research on Student and Teacher Learning

In the last dozen years or so, there has been a significant body of research on learning and most of what has been found appears to apply--at least in general terms--to both students and teachers (and everyone else). While researchers differ about particulars of different propositions about learning, and while the specific instructional implications of this research are being developed and debated, there is growing consensus about a range of very important findings, some of which can be summarized by the following propositions (cf., Bransford, Goldman & Vye, 1992; Brown, 1984; CCSSO, 1991; Paris & Lindauer, 1982; Resnick, 1987):

1. Learning occurs in social contexts that facilitate or interfere with certain kinds of thinking activities. To understand learning, one must understand the circumstances of its acquisition and its demonstration, including the social and interpersonal interactions in which the learner engages.

2. Learning proceeds best when individuals are actively engaged in the learning activities.

3. A great deal of thinking depends on knowledge; what you know in a domain greatly influences your ability to learn in that domain.

4. The "building block" model of learning, wherein component skills are mastered in isolation from and before the task which the components comprise, is being challenged by a more holistic model. The behaviorist model is being replaced with a cognitive model.

5. The belief that one must learn basic skills or operations before one can learn more complex and more abstract knowledge and ideas is wrong; the learning

of basic and higher order skills and knowledge is best accomplished simultaneously.

6. Learning proceeds best when the tasks involved are meaningful and authentic.
7. Persistence at a learning task depends on the assumptions one makes about one's own competence and the nature of intelligence.
8. The imprinting of information seems to follow specific routes from an idea to spoken words, to listening, and to ownership of that idea. These routes form a cognitive map from stimulus to understanding. Thinking and understanding are the results of building patterns of knowledge and of developing strategies to incorporate new information with old, i.e., building networks of information that bridge the gap between what the learner knows and does not know.

Among the more important implications of the research just discussed are that how and how much students learn depends on both formal and informal messages and events they observe and that these observations create different levels of cognitive demand in which different students engage (Bereiter & Scardemalia, 1987). It follows that an understanding of student learning must take into account the nature of the environments in which students spend their time and the relationships among those contexts.

The propositions cited above do not deal with every aspect of more recent research on learning; the point here is that these understandings are fundamentally different from those upon which most curricula, tests of student performance, and teaching practices are based. For example, these understandings of how children learn undermine the traditional emphasis on maximum content coverage and rote learning of basic skills, and challenge teachers to engage in more in-depth treatment of topics and to focus on higher order thinking and learning skills for all children (Carnegie Council, 1989). Research on learning defines a new knowledge base for the education of teachers and raises serious questions about the efficacy of the way we educate teachers, both in preservice preparation programs and inservice "professional development."

Summary

The issues addressed in Part I of this report have enormous implications for the education of teachers. Briefly stated these are:

- Many of the beliefs about student learning that have shaped our understanding of how best to teach appear to be inadequate or inaccurate. These mental images need to be changed before we can bring about changes in how and what teachers learn at different stages.

- Teachers must have a greater repertoire of instructional knowledge and skills than ever before.

- Despite a growing knowledge base about teaching and learning, the diversity of students' needs and the variety of influences on student learning precludes the utilization of simple decision rules about teaching so that effective teaching involves the solution of a broad range of constantly changing problems.

- Teachers grow in their capacity to learn. Novice teachers tend to underutilize the knowledge they have in part because they lack the cognitive skills to use that information in complex situations--like most classrooms.

- Because teachers grow in their capacity to use knowledge and to generate new knowledge, and because learning is greater when one is involved in successfully using knowledge to solve real problems, learning opportunities linked to efforts to improve the learning of the students for whom teachers are responsible will be more productive of effective teaching than those that are not.

- The demography of the state is likely to result in most Pennsylvanians perceiving that they have little self-interest in quality education for all children. Thus, teachers need to be prepared to facilitate public understanding of the needs of children and other learners served by schools.

These points mean that strategies for educating teachers should recognize that (1) teachers have different needs, motivations, and capacities to learn at different stages of their professional development, (2) teachers need to have much greater capabilities and much more effective learning opportunities and resources than most now have to learn through problem-solving, (3) opportunities to learn should be continuous and complementary, and (4) many lessons teachers need to learn can best be learned in schools _if_ such lessons are based on accurate information about the problem to be solved.

PART II

THE INFLUENCE OF SCHOOL REFORM AND FEDERAL POLICY ON THE EDUCATION OF TEACHERS

In the 1980s, there were more laws and regulations enacted relating to elementary and secondary education than during any other decade in our history. These policies are shaping and will shape the demands on teachers and, therefore, what teachers need to know and be able to do. During this time, the federal government was more or less passive about schools; the proportion of local expenditures coming from the federal government declined and no new legislation of major consequence was passed.

In this section, we discuss implications for the education of teachers of some major trends in educational reform at state and local levels as well as the potential effects of federal policy.

The School Reform Movement

The so-called school reform movement is really many movements, some of which go in opposite directions, even within the same state. It seems fair to say that the energy behind the most popular reforms derives not from the concerns we identified in Part I but from the erroneous belief that the nation's schools have fallen in quality. Thus the school reform movement began in earnest with a set of policies that embodied a "shape up or ship out" perspective. Much of this impulse to focus on standards and motivation, for both students and educators, remains influential (Hawley, 1988).

Increasingly, however, nationally-heard calls for reform have focused on the need to improve students' opportunities to learn and recognized that effective teaching is essential to effective schools. On the other hand, assumptions that underlie specific proposals for reform, especially those that have found their way into public policy, seem to be rooted in conceptions of teaching and learning that are outdated and unsuited to bringing about higher order learning for all children.

We make no attempt to assess the full range of reforms. We focus on those with the greatest implications for what teachers will be expected to know and be able to do, for who our teachers will be, and for how they might learn.

We examine seven strands of reform which appear to have continuing momentum:

1. Restructuring decision-making
2. Restructuring how children learn
3. Curriculum reform
4. Demands for greater accountability
5. School readiness
6. The use of educational technology
7. National goals and standards

The extent to which some of these concerns manifest themselves in Pennsylvania varies from locality to locality.

In comparison to many states, Pennsylvania has been relatively inactive in promoting reforms through policy changes. One recent study of state policy initiatives described as promoting innovation (Boe, et al., 1993) shows Pennsylvania as one of a handful of states adopting three or fewer major reforms. Ernst (1990) examined teacher education policymaking in eight states (California, Colorado, Georgia, Illinois, Iowa, Massachusetts, Oklahoma and Pennsylvania) and concluded:

> While Pennsylvania has implemented several teacher programs that indirectly relate to teacher education and certification, it has been a state void of many far reaching policies. As noted above, the addition of the six-credit requirement stands as the most important change in teacher certification and teacher education--hardly a world-shaking issue.

Our discussion in this section goes beyond the characteristics of current state policy in Pennsylvania, however. Events in other states may influence future action in Pennsylvania as they already have in some school districts.

Restructuring Authority for Decision-making: Where, Who, and What?

While the nation-wide reform movement began with attempts to fix the existing system through centralized, top-down controls and standards, the conclusion was soon reached that more was needed. Proposals for decentralization, "shared decision-making," school-based management, and other ways to restructure authority in school systems began to appear.

Murphy (1992) argues that advocates of school restructuring operate out of a different framework for education and school change than that of earlier reformers. This "wave two" of reform assumes that real change will occur only with the empowerment of teachers and parents at the school level. Some groups took this notion a step further. "We recommend nothing less than a revolution in the role of the teacher and the management of schools in order to upgrade the quality and professionalism of the US teacher workforce" (Committee for Economic Development, cited in the Carnegie Forum for Education and the Economy, 1986, p. 36).

Rebarber (1992) summarizes the two major policy themes which recur throughout the restructuring movement: (a) a centralized, bureaucratic system focusing on rules and procedures rather than on results is incompatible with significantly improved student knowledge and skill; and (b) because each learning environment is a "unique combination of personalities, relationships, and physical circumstances that requires frequent adjustment," decisions must be made by those most knowledgeable about the setting, those on-site.

The changes called for by the restructuring movement involve new and different views of schools. Instead of the hierarchical, bureaucratic organization patterns which have historically governed schools, authority must become more decentralized, leading to "very basic changes in roles, relationships and responsibilities" (Seeley, 1988, p. 35). Real education transformation will require involvement of all key players, components of the system, and at least three restructuring strategies: school-based management, teacher empowerment, and parent and community involvement. Some advocates of restructuring also insist that changes in the teaching-learning process (i.e, teaching for understanding) must be part of the effort. We discuss this perspective below.

School-Based Management. The most prevalent form of school restructuring is school-based management (SBM)(Rebarber, 1992). Under SBM, schools take on, to varying degrees, control over instruction, budget, personnel, and school organization. Most SBM plans include a school council of parents, teachers, and administrators, which share planning and decision-making tasks. Rebarber (1992) defines instruction as curriculum and pedagogy; he points out that, while SBM schools have great control over pedagogy, curriculum is often controlled at the state level. This distinction may be problematic. Others (e.g., Evertson & Murphy, 1992) have demonstrated the important link between curriculum and pedagogy: how something is taught is seen as defining what is taught.

One problem that has arisen in some SBM schools is internal conflict among teachers and other stakeholders, who may not agree on the vision and direction their school should take. One proposed solution to this problem takes the form of establishing "Charter Schools," which are begun from the ground up, based on proposals from a group of like-minded teachers or others. In these "from scratch" schools, a complete staff with a shared vision can be recruited and assembled, reducing the need for compromise or the likelihood of watering down of the stated goals of the school (Rebarber, 1992).

Teacher Empowerment. Two strategies for teacher empowerment are providing teachers with formal decision-making authority and redesigning their work, including new leadership roles and career opportunities that allow teachers to advance in the profession without leaving the classroom. On the one hand, most teachers (nationally) appear to feel that they have little influence on school-wide policy (Office of Educational Research and Improvement, 1993). On the other, many teachers are wary of assuming more responsibility for policy, especially if district or state accountability mechanisms are incompatible with their concern for preserving and extending professional discretion in their own classrooms.

Parent and Community Involvement. Empowered parents and community members exercise more influence over school decision-making processes. The school community is expanded to include parents, community members, professional educators, businesses, universities, foundations working together to improve schooling.

Implications of "Restructuring" for the Education of Teachers. Restructuring authority in schools invariably expands teachers' formal responsibilities and increases the range of capabilities they must have, in addition to collaborative skills and dispositions, taking on leadership roles, and relating to parents in different ways. All of this may be professionally rewarding for some teachers, but it is likely to be stressful for many as well.

One direct consequence of restructuring is that it increases the need teachers have for opportunities to learn leadership skills. Decision-making, parent relations, leadership, and collaboration are not abstract concepts; the skills involved are most likely to be developed when there are opportunities to practice within the context in which these skills can be used.

Still, these reforms miss the mark because new roles and responsibilities for teachers and parents, or decentralizing decision-making to the school level will not ensure that teaching for understanding occurs. While organizational changes can provide the enabling conditions for more fundamental systemic change, many reformers assume that the connections will be made without addressing them directly.

Restructuring Student Learning: Teaching for Understanding

Teaching for understanding represents a shift from teacher-centered to student-centered learning within the context of more coherent curricular programs and more flexible organizational structures (David, 1989; Elmore, 1989; Murphy, 1991). While those who study educational reform increasingly call for restructuring teaching to improve teaching for understanding, this approach to reform has received relatively little attention in the reform reports and in state, district, and school-level efforts to restructure schools. Rather than "mapping backward" from the student to the organization, the restructuring movement has approached change with little emphasis on what is to happen in the classroom. This general absence of attention to teaching and learning in discussions of school reform is troubling for three reasons. First, since teaching and learning are what schools are about, it seems illogical to look elsewhere for improvement. Second, in the absence of linkages with teaching-learning processes, the other elements of restructuring often are treated as ends in themselves, pursued without being grounded in the essential purposes of schooling (in contrast, see the Council of Chief State School Officers, 1990). Third, a number of researchers have been hard pressed to find any empirical connections between the other components of educational change such as those just described and improved educational processes and outcomes (cf. Malen, Ogawa, & Kranz, 1989).

What are the implications for teachers of restructuring teaching and learning? Newmann and Clune (1992) point out that when school restructuring calls for "fundamental redesign" of teaching and learning, the roles and responsibilities of teachers are both deeper and broader. Teachers have to take on roles such as "instructional coach, curriculum team member, entrepreneur to build new programs, student advisor/confidant, and participant in organizational decision-making" (p. 1). As the authors point out, few teachers have been prepared to take on these roles.

Teaching for understanding will require a series of transformations that affect both teachers and students. If the student is actively involved in constructing, interpreting, and making and exploring meaning, the student must be in a more active role. A new role for students requires a new role for teachers. This requires finding ways to help teachers make the transformation from a minimum competency curriculum with accompanying assessment to learner centered, multi-task settings where students take charge of their own learning.

When teachers begin to see learning in different ways, new organizational structures and new ways of bringing content to students also emerge. Elements of practice must be relearned. This may mean that teachers move through developmental stages in the process of refining, extending, and modifying their teaching. Because teachers are also relearning ways of bringing knowledge to students, students must also relearn studenting (Evertson & Murphy, 1992; Fenstermacher, 1986).

The culture of the classroom and the school must be rebuilt to support these new ways of thinking about learning. Three things which teachers must relearn in order to participate in the rebuilding of classroom and school culture are learning to see learning in different ways, managing the complexity of new forms of instruction, and managing uncertainty.

For teachers to promote the development of a learning orientation in restructured schools, they will need to engage in regular and important exchanges with their colleagues. Teachers will need to participate in decisions affecting the entire school and frequently perform leadership tasks and the managerial and leadership roles of teachers will need to be institutionalized (Sykes & Elmore, 1989). As Berliner (1990) argues, our images of the traditional roles of teachers must expand to include the executive functions that teachers perform. The metaphor of teacher as executive manager helps to convey the multiplicity of tasks teachers perform and it also broadens the traditional roles of teachers beyond being simply imparters of knowledge. To perform as managers or executives, teachers will need to be more collegial, to develop more interdependence with peers, and to share their knowledge with others in a variety of settings. In restructured schools, teachers will need to model a professional culture that can serve as an analog for classroom learning environments.

The implications of these new roles for teachers for the education of teachers go beyond the content and processes of professional preparation. In other words, this is not "simply" a matter of developing new knowledge and skills. What is involved here is a sea-change in the way teachers think about teaching and learning and what they value. As we pointed out in our discussion of site-based management, teachers are wary of taking on new roles and responsibilities. Most tend to see their current responsibilities to be excessive and they appear to feel increasingly vulnerable to criticisms and influences about which they can do little.

Significantly changing the roles of teachers means changing the roles and behavior of teacher educators, and expanding our images of what teaching is and what knowledge and skills are needed to prepare teachers to fulfill these new functions. In other words, while the learning opportunities available to teachers must encompass the knowledge and skills needed for these expanded roles, those who prepare teachers will need to reexamine their own roles as well as their assumptions about what teaching and learning involves. Moreover, the role of administrators, at the school- and district-level, will also have to change if "teaching for understanding" is to be more than a slogan.

Curriculum Reform. Curricula look different when classroom processes are restructured to facilitate higher order learning for all students. Curricula in restructured schools will be more complex and more cohesive. They will include expanded use of a core curriculum; more extensive use of integrated and interdisciplinary content; emphasis on depth of coverage; use of more original source materials; greater focus on higher-order learning skills; alternative methods of student assessment; and greater latitude in teacher choice of what is studied and how.

Restructuring schools to enhance teaching for understanding means fundamental curricular changes at all levels. These changes will have to be more comprehensive than in the past. Advocates for significantly improving schools increasingly are arguing that curricular reform should be an integral part of what is being called "systemic" reform. Thus as Newmann and Clune (1992) argue, systemic curriculum reform would require coherent changes that influence curricula in "colleges and universities; state agencies that license teachers; regional agencies that issue regulations on curriculum, testing, and staff development; producers of tests and instructional materials; and staff development organizations" (p. 2).

Systemic curriculum reform calls for the coordination of many institutions on a regional level, so that, for example, preservice teachers are being prepared to teach a curriculum which the college or university has had a hand in developing. Proponents of systemic curriculum reform, however, do not advocate a strongly centralized, top-down regulation of curriculum; schools must retain a great deal of latitude over instructional decisions. Systemic reform efforts "... would provide substantive content through curriculum standards, instructional materials, assessments and staff development, but would refrain from prescribing details of classroom practice and school organization... Teacher preparation institutions would align their instruction to the system's guidelines and resources" (Newmann & Clune, 1992, p. 2). Just how all of this can be accomplished without a strong role for state governments and the influence of national or regional agencies remains to be worked out by advocates of systemic reform.

While advocates of systemic reform (who include key persons in the Clinton Administration) suggest how the process of curriculum reform might occur, there is less agreement about the content of the curriculum that is to be reformed. That is, many decisions around what knowledge is of most worth for teaching for understanding must still be made. Not surprisingly, academicians and others from across disciplinary areas have set forth standards for the concepts and skills in their disciplines (i.e., NCTM, The National Council for Social Studies (NCSS), etc.).

These and other issues related to curricular reform have major implications for teacher preparation and raise a number of important questions. For example, a curriculum that is designed around how students solve problems engages fundamentally different assumptions about the nature of disciplinary knowledge, what it means to learn, what learning is, and how it can be assessed. For teachers in restructured schools to enact the new curricula, they must first understand and be able to teach in these new ways. Again, this suggests fundamental changes for teacher educators and the curriculum for teacher preparation.

Accountability. As we noted earlier, the first wave of reforms in education heavily emphasized rules, regulations, and increased spending. These strategies had limited effect on the perceived quality of public schools and new calls were heard for reforms that would create structures and incentives that fostered improvement. Thus, an increasingly popular strategy for bringing about change is to deregulate and decentralize on the one hand, and insist on greater accountability for increased student performance on the other. This seems like a reasonable approach to many policy makers. In practice, however, accountability schemes commonly used often discourage rather than promote innovation. The dual commitment to less prescription in policy and more emphasis on outcomes embodied in current Chapter 1 policies, for example, seems to have resulted in modest gains, low expectations, and emphasis on avoiding failure rather than encouraging the pursuit of ambitious goals in innovative ways (Herrington & Orland, 1991; U.S. Department of Education, 1992; Winfield, 1991).

There are many ways to hold teachers and schools accountable. Darling-Hammond and Snyder (1992) identify five types of accountability--political, legal, bureaucratic, professional and market--each of which may have several elements. In most schools, teachers experience multiple and sometimes conflicting standards but those most attended to by policy makers and the media tend to have little to do with facilitating improvements in teaching. Indeed, these multiple mechanisms for providing control and direction can result in gridlock.

All of the policies most commonly advocated as ways to hold teachers and students accountable either leave in place or heighten the significance of tests of student achievement. Most educators feel that these tests are invalid measures of student learning which do not begin to reflect the goal of higher order learning for all children. Standardized, norm-referenced tests that rely heavily on multiple choice questions limit what and how students are taught (Madaus & Kellaghan, 1992; Wilson, 1992). Because the tests of student performance measure narrow and decontextualized knowledge and skills, teaching that focuses on drill and practice and rote learning can produce modest test score gains. But this strategy, like "cramming" for a college test or a civil service exam, encourages test takers to see the tests as meaningless in the long run and what is learned "for the test" is usually quickly forgotten. Not only do the tests most commonly used to "hold schools accountable" discourage teaching for understanding, they have limited effect on teacher motivation to improve, even when meeting the standards would bring economic or status rewards. The reason for this limited motivational value of student (or teacher) testing has to do with a basic element of motivation theory--goals and the measures of them should be meaningful to the persons whose behavior is to be changed (Vroom, 1964; Lawler, 1981).

Accountability measures define both what teachers.want to learn and how they learn. If important decisions are perceived to be related to test results, then teachers will teach to the test. Eventually, through the accumulation of past exams, the assessment defines the curriculum. When they are guided by this assessment-based curriculum, teachers pay particular attention to the form of the questions on the test (short answer, essay, multiple-choice) and adjust their instruction accordingly. Power over classroom instruction and curriculum is thus transferred to the agency that sets or controls the exam (Madaus & Kellaghan, 1992).

The more the measures focus on higher order learning and problem-solving, the more they will encourage strategies for educating teachers to focus on how these goals can be attained. Moreover, if assessments of childrens' learning reflect an understanding of how children learn and that developing a capacity to learn is essential, this should shape the way teacher learning is facilitated. It is no accident that the most common formats for educating teachers now mirror the way teachers themselves teach.

In a study of the effects of using improvements in test scores to evaluate or rank schools and school districts, the consequence is that educators "... opt for change rather than improvement and made quick, knee-jerk decisions rather than engaging in a more systematic process that would improve the long-term quality of the decisions made" (Corbett & Wilson, 1992).

This is not surprising. As we noted, most teachers don't believe that standardized testing of the sort used to "ensure accountability" helps them teach or students to achieve important learning goals (Herman & Golen, 1993). When this is coupled with "high stakes" outcomes for schools and teachers, there is considerable risk that teachers and principals will engage in practices that discourage student learning and may actually be dishonest. Darling-Hammond (1992a) observes that research has already uncovered the serious negative consequences resulting from using school test scores for evaluating school and teacher quality. Some of the unintended effects are (1) that large numbers of low-scoring students are labelled for special education placements so that their scores won't "count" in school reports, (2) students are more likely to be retained in grade so that their relative standing will look better on grade-equivalent scores, (3) low-scoring students are excluded from admission to open enrollment schools, and (4) such students are encouraged to leave schools or drop out.

School staff incentives are also affected by these policies in that talented staff opt for school placements where students are easy to teach and school stability is high. Since performance standards are paramount, capable staff cannot be expected to risk losing rewards or incurring sanctions by volunteering to teach where many students have special needs. The educational chances of disadvantaged students are further compromised, the very students who are already served by a disproportionate share of those teachers who are inexperienced, unprepared, and underqualified.

Moreover, as some states have learned (Herman, 1993) and as the response of many school districts to accountability requirements of Chapter 1 shows, high stakes tests tend to drive standards down or at least discourage the setting of high goals for all children (Winfield, 1991).

These concerns about accountability schemes that use conventional methods to assess student achievement, plus the notion that all children need to be able to engage in higher order learning, have energized the search for more "authentic" forms of assessment. But the limits of outcome-focused assessment have also led to a growing interest in ensuring that schools have the resources they need to be effective, a point we return to in our discussion of national goals and standards.

Problems with the use of measures like those used in Pennsylvania's TELLS test have been discussed by Cooley and Bernauer (1990). To extensively review these points, and other criticisms of conventional tests used to hold schools, teachers, and students accountable would be irrelevant given the recent decision in Pennsylvania to measure student performance in terms of more than 50 specific outcomes. The point that needs to be made with respect to the education of teachers is that both the substantive content of the outcomes and the way they are measured will affect the quality of teaching (Resnick & Resnick, 1988). Most obviously, teachers will want to learn the content to be tested. Seemingly, the way content is measured will affect how teachers teach. For example, if tests require solutions to complex authentic problems or the ability to derive reasonable propositions from literature, teachers will teach accordingly. Least obviously, if assessments do not help teachers improve their teaching, they are more likely to affect what is taught and how it is taught (Frederickson & Collins, 1989). These three observations have implications for the education of teachers. If the design of assessments of student outcomes takes into account the consequences the assessments will have for teacher learning and behavior (Shepherd 1992), they can significantly influence not only how teachers learn to teach, but what they want to learn and do, once they are on the job.

School Readiness. In the past 20 years, major demographic changes have altered the character of American family life. Because of the increasing proportion of mothers in the workforce (50% in 1990), the proportion of school-age children whose mothers work outside the home has risen to 65%. Of this number, 54% of the mothers of children below the age of one year are in the labor force, and this trend continues (Galinsky & Weissbourd, 1992). Furthermore, the proportion of the nation's children living in poverty has increased substantially (Children's Defense Fund, 1990). These statistics, plus a large body of evidence favoring early childhood intervention to support health development and readiness to learn, has led to proposals for extended care for pre-kindergarten children using the facilities of the public schools (Zigler & Gilman, 1993).

The influences on children's learning readiness involve problems to which the full range of health and human services need to be addressed. Thus, there is growing interest in comprehensive, coordinated, and integrated services for children who are identified early as being at risk of poor school performance. That there are implications of these new directions for teacher preparation and the continuing education of teachers is evident.

The movement for extended care, while far from widespread, has gained momentum in several states (e.g., Arkansas, Colorado, Connecticut, Iowa, Kansas, Kentucky, Texas and Wyoming). The momentum comes from two different but related national trends The first are the changing demographics and the second are moves from the National Association for the Education of Young Children (NAEYC) and other advocates for children, including many teacher educators, for more rigorous preparation of child care professionals. These initiatives are based on the growing awareness that early intervention is a major factor in children's readiness to learn and their later academic success (Consortium for Longitudinal Studies, 1983; Kendall, 1992).

The same influences that impede some children's preschool readiness to learn continue to affect their ability and motivation to learn through their school years. Indeed, some influences, such as community disorganization, become more salient to their performance in school as young people grow older. This realization has led to the development of the idea of school-based or school-related child and youth service centers. Kentucky, Maryland, and Florida are states which have undertaken such reforms. Similarly, Pennsylvania's "Children's Cabinet" signals growing interest in multiple needs of children "at-risk" in more integrated and coordinated ways. Several private foundations are supporting the design and implementation of model programs.

The public schools have been targeted as prime candidates for the inclusion of these extended services because of the availability of space and also because federal and state funding mechanisms use conduits that are already in place. While these are at the organizational level, a more fundamental reason for targeting the schools is because of their ready access to the population that needs to be served.

A growing number of teacher preparation programs are increasing their emphasis on infants and toddlers and adding courses to the preservice curriculum (Kendall, 1992). But the unmet challenge is to define the appropriate role of teachers in the constellation of program activities essential to school readiness, broadly defined. In our minds, the fundamental job of teachers is to facilitate cognitive and social development in schools. Thus, the ability of teachers to diagnose potential problems and to then work with parents and other professionals to ensure that all students get access to the services they need should be the focus of efforts to enhance teachers' learning with respect to school readiness.

Universities educate the full range of professionals who serve children. They do this in separated professional schools where faculty seldom interact with "colleagues" in other schools. Not surprisingly, professionals in different fields often have incomplete understandings of basic influences on cognitive and social development and what they do believe sometimes conflicts with the basic ideas being learned in other schools. One step toward enhancing the possibility that the services children do receive can be complementary is curriculum reform across those professional schools in universities which educate people who work with children.

Increased Use of Educational Technology. The increasing availability of technology with the potential to facilitate student learning obviously means that teacher candidates and experienced teachers need to develop the capacity to use the technology. Moreover, technology changes rapidly so that teachers will need continuing opportunities to update their knowledge and skills.

Substantial funding from the National Science Foundation and other sources has led to the development of simulations and interactive training programs for both preservice and inservice teacher education. While these resources are not now widely available, they almost certainly will be in the near future.

Telecommunications is an increasingly powerful tool to facilitate teacher and student learning. Distance learning may be even more helpful to teachers than to students. Teachers will almost certainly have access to computer networks that connect them to other teachers, university faculty, and to massive amounts of information that can help both them and their students learn. Recently, for example, the University of Maryland has given every teacher in the state access to Internet.

The greater the power of technology, the greater its potential to influence the way teachers think about teaching and learning. This seems particularly true for interactive hypermedia programs. Their architecture reflects theories of learning and the theories they embody vary from sophisticated behaviorist ideas about learning to constructivist conceptions. In other words, while teachers can significantly influence the effects of technology on student learning, technology also has the potential to teach teachers.

National Goals and Standards. At least since 1989, interest in establishing goals and standards for student performance has grown. The National Goals adopted by the Governors and the President of the United States in 1990, and the follow-up work of the National Goals Panel are the most visible, but not the only manifestations of this interest. While all current proposals are to be voluntary, it seems likely that they will influence state and local policies.

The most obvious implication of this movement for the education of teachers is that teachers will have to learn how to teach the new content being identified in these processes. And, of course, the way standards are to be measured will influence how teachers think about teaching. Indeed, the major source of conflict in discussions about national goals and standards is differences in how far and how fast assessment should move away from traditional tests of students' knowledge and skills. It is too early in this debate to tell which advocates will prevail. The advocates of teaching for understanding get the most press but they do not design and publish tests--at least not yet.

The national goals and standards movement has focused on student performance. But the idea of service delivery standards is receiving increasing attention. The premise of delivery standards is that if schools are to be held accountable for student performance, localities and states should be held accountable for ensuring that schools have the resources to do the job being asked of them.

Among the most important resources schools have to influence student learning is the quality of teachers. Thus, if the service delivery advocates prevail, which is by no means clear, it might be expected that the adequacy of teacher preparation and continued teacher learning will mean that the resources committed to professional development will be the target of standards. Such proposals are, in fact, embodied in the 1992 report of the National Council on Education Standards and Testing. This, in turn, may focus attention on the role colleges and universities play in the continuing education of Pennsylvania's teachers.

At least one other government effort to influence national, if not federal, policy deserves attention. In mid-1992, the congressionally mandated, bi-partisan National Commission on Time and Learning met for the first time. This Commission, which reports to both Congress and the President, has defined its role broadly to include increasing the time available for teacher, as well as student, learning.

Even before political efforts to create national standards became visible, various professional organizations representing academic disciplines were working on guidelines to shape curriculum content and, in some cases, teaching strategies. The most successful and most widely endorsed example of this type of development is the standards of the National Council of Teachers of Mathematics (NCTM). The NCTM standards seek to promote major changes in how children learn mathematics and in what children learn about mathematics. NCTM does not, it should be noted, deal directly with student performance standards.

These efforts by professional groups to establish standards aimed at influencing achievement have the potential to reshape teaching and learning. But even the NCTM standards, which became public five years ago, have been slow to influence teaching and curricula in most schools. The best mechanism for diffusing and supporting the implementation of ideas and practices like those developed by NCTM may be schools of education. But there are no resources to bring teacher educators on board and to develop the capacity to support change at the school system level that effective implementation would require.

Increased Teacher Salaries. Throughout the nation, and in Pennsylvania, a significant proportion of the resources allocated to educational reform has gone to increase teacher salaries. The fundamental argument for this policy has been that better salaries will increase the quality of people who are recruited to and retained in teaching. Beginning teacher salaries, however, are only part of this story. Long-term salary prospects and conditions of work are also important to potential teacher candidates when they decide whether and where to teach (Murnane et al., 1991). Some experts conclude that the continuing problem of finding qualified math and science teachers is related to the absence of differential salaries for such teachers; that is, the salary differential between liberal arts graduates in the fields of science and mathematics and teachers is significantly larger than the salary gap between liberal arts graduates and the social science and humanities teachers (Odden & Conley, 1992; Darling-Hammond, 1984). In some states, especially Southern states, salary increases have been tied to various forms of merit pay or differentiated roles but the interest in this approach appears to have faded.

There is growing evidence that higher teacher salaries could result in more effective teachers. Eric Hanushek (1989), most often cited for his studies arguing that school expenditure levels do not predict student achievement levels, has argued that "almost every economist would support the argument that increasing teacher salaries would improve the quality of the teacher candidate pool." Recent studies in other states link teacher salaries and student performance and/or teacher qualifications (Ferguson, 1991; Murnane, et al., 1991). Cooley (1990) examined data from Pennsylvania to determine the relationship between various sources of expenditures and student pass rates on TELLS. He concluded, controlling for the socioeconomic characteristics of students in each district, that higher teacher salaries were associated with fewer students not passing the test.

However, an across-the-board salary increase for teachers is probably a relatively inefficient mechanism for changing the quality of education in Pennsylvania--and elsewhere. First, teacher salaries differ substantially across the state, reflecting, in part, the heavy dependence of schools on local funding compared to other states. Thus, across-the-board increases would be very expensive and would maintain the current distribution of talent. This may be more true in Pennsylvania than in other states because of the very large and worsening fiscal inequalities among districts (Cooley & Pomponio, 1993). Second, the main effect of across-the-board salary increases would be felt mainly at the entry level. There are, however, relatively few entry level positions available for new teachers. Third, even with respect to the small cadre of entering teachers, their ability to use their talent would be significantly shaped by the behaviors and beliefs of the specific teaching corps of which they become a part (McLaughlin & Talbert, 1993; Rosenholtz, 1989). Fourth, overall, teacher salaries in Pennsylvania are relatively high compared to other states (Lausberg, 1991).

Increases in teacher salaries are most likely, for reasons just noted, to affect the quality of teaching if such increases are targeted on districts where talented people are drawn to other professions because of relatively low teachers' pay and are differentially focused on early career stages so as to attract and retain people with other employment options (Murnane, et al. 1991).

In any event, there is abundant evidence that teachers' effectiveness can be increased by effective professional development, both preservice and inservice (Hawley, 1992; Lieberman, 1992). The problem, of course, is to separate more effective teacher learning practices from less effective ones. This report seeks to do this with respect to the preservice education of teachers while recognizing that the quality of professional learning opportunities teachers have once they enter the profession will significantly influence the degree to which teachers' preservice knowledge and skills affect student learning.

One can argue the importance of investments in professional development under many circumstances. But good professional development is particularly important when major changes in curricula and teaching methods are needed, as we have argued they are in Part I of this Report. Under these conditions, changing either the incentives to teach (such as salaries) or the conditions of teaching (such as class size or resource materials) is not likely to have much effect on bringing about significant improvements in students' performance.

The Influence of Federal Policies and Programs on the Education of Teachers

There are many ways that federal education policies influence what teachers need to know and be able to do. However, there is no consistent set of policies in place at the federal level that is targeted on improving the education of teachers. Many federal categorical programs allow for and, in some cases, require teacher training as part of the allocation of funds. These programs have no discernible effect on the bulk of initial teacher preparation programs or on the character of inservice education most teachers experience.

Programs Focused on Preservice and Inservice Teacher Preparation

The Office of Special Education Programs targets relatively small amounts of money for the development of innovative training programs for teachers of students with special needs. For example, programs are funded to prepare students to meet the needs of infants with handicaps. As far as we can tell, there is no research on whether these innovative programs are significantly different from conventional programs in their impact on what teachers know and are able to do, or on whether the innovations developed in these programs have been widely disseminated to other teacher education programs. In all but a handful of the major schools of education, the preparation of teachers of exceptional children is carried out in an organizational unit separate from the main ("regular") teacher preparation program. Moreover, there often are significant philosophical differences between special education faculty and other teacher educators regarding effective teacher practices, particularly with respect to how behaviorally-focused and structured instruction should be.

The National Science Foundation (NSF) has invested large amounts of money in recent years in the development of model inservice and preservice teacher preparation programs to improve the teaching of science and mathematics. There has been, however, no plan in NSF to systematically evaluate the effects of these programs, either in terms of their impact on teachers and students, or their transfer from the initiating institutions to others.

While NSF-supported professional development projects have not been designed to meet a particular set of guidelines, most of those funded in the last two or three years seem to reflect a commitment to encourage instructional strategies that (1) embody the constructivist theories of learning we identify in Part II of this Report and the general approaches to teaching for understanding advocated by the National Council of Teachers of Mathematics (NCTM), and (2) make extensive use of educational technology. In addition, NSF has encouraged the development of new approaches to student assessment which could, in turn, change the way teachers teach. These assessment strategies, however, tend not to engage the issues of accountability of concern to policy makers and would have the consequences of creating parallel and, perhaps, competing assessment systems if they were widely implemented.

Much of the NSF K-12-related funding has gone into curriculum development. The themes found in the professional development projects just noted are also found in the curriculum projects, many of which consciously seek to restructure teaching.

Whether the NSF-supported programs of professional development and curricular revision will have much influence on changing teaching and the education of teachers remains to be seen. The NSF has no systematic strategy for promoting the dissemination and diffusion of most of its projects. Its main efforts to encourage utilization are what it calls the "systemic initiatives" projects in several states. First funded in 1992, it is too early to tell what the effects of this strategy will be.

Perhaps the best known programs for teachers supported by the NSF are the Institutes that provide learning opportunities for outstanding teachers primarily during the summer. Here again, there are no systematic analyses of the effects of these programs and critics suggest that while the seminars may be appropriate for individual teachers, they do not address the problems of bringing about change in institutions. Indeed, even those teachers who do participate may have a difficult time implementing the things that they learn about in the summer program because of institutional constraints.

Both the Fund for the Improvement of Post-secondary Education (FIPSE) and the Fund for the Improvement and Reform of Schools and Teaching (FIRST) allocate modest amounts of funds to encourage innovative programs for educating teachers. These funds, for the most part, focus on collaborative efforts between schools and school systems or, in the case of FIPSE, on changes in organizational relationships within institutions of higher education. Somewhat dated analyses of the effects of the FIPSE programs suggest that they have a high rate of retention in the institutions involved but little diffusion beyond those institutions. We see no reason to believe that this general finding with respect to FIPSE programs would not apply to those related to the preparation of teachers since few funds are provided to foster dissemination or to offer technical assistance. Similarly, the FIRST-supported programs, while they have focused on the development of school-university collaboration and thus reflect a trend in teacher education, have not been refunded and resources are not allocated to encourage their diffusion. Therefore, the effects of this effort may be short-lived. In any event, neither the FIPSE nor FIRST programs invest in the serious evaluation of their effects and so the basis upon which one might encourage diffusion of particular models is uncertain.

The Office of Educational Research and Improvement (OERI) supported a national research center, called the Center for Research on Teacher Learning, which is based at Michigan State University. This center, now in its tenth year of operation, has yet to yield any significant findings with respect to the differences in the effects of alternative strategies for preparing teachers. Throughout this study, we cite specific findings from National Center studies that are useful for identifying particular things that do not work and the ways teachers learn, but the identification of effective models for the education of teachers has yet to be achieved by this Center.

OERI also has funded several "regional laboratories" whose purposes are to facilitate school improvement through applied research, dissemination, and technical assistance. Research for Better Schools (RBS), the regional laboratory serving Pennsylvania, has a strong reputation among academicians. However, RBS was never mentioned in any of the interviews we conducted or in any of the documents or reports we read related to preservice teacher education or induction. Most laboratories have had little involvement in teacher preparation, perhaps because they take their priorities from policy makers and practitioners. RBS has been concerned with school restructuring and its findings and recommendations are generally consistent with our discussion of where the restructuring movement might go, with appropriate professional development opportunities for teacher candidates and teachers.

OERI also houses the National Diffusion Network (NDN). The NDN encourages the dissemination of over 90 programs to improve classroom practices and student learning through teacher and administrator training. To secure NDN funding, programs must pass rigorous outside evaluations of their claims for effectiveness. Pennsylvania's State Facilitator Project, supported by the NDN, works to help schools adopt validated programs. The models used in these efforts vary from project to project. In spite of these efforts, the models for educating teachers that are used by various NDN projects are making progress, but do not as yet appear to have major statewide impact on school systems or schools of education.

In 1992, the United States' Congress reauthorized and amended Title V of the Higher Education Act, the major piece of federal legislation that focuses specifically on teacher preparation. Title V authorized several new programs aimed at teacher recruitment, preservice preparation, and inservice professional development. Most of these initiatives were not funded and according to lobbyists and congressional staff people we interviewed, there is little chance that they will be funded in the near future. Some new programs embodied in Title V were funded, most notably the provisions to increase the number of minority teachers in the profession.

While it is unlikely that the federal government will in the next two or three years initiate significant new programs in the areas related to the education of teachers, three policy initiatives supported by the Clinton administration could have significant effects on teacher education, especially the professional development of the current teaching corps. First, the proposals to create national service opportunities for college graduates as a way of repaying their college loans and a bill passed by the Congress to support the transition of military and civilian personnel displaced by defense cutbacks by providing them an opportunity to teach seem likely to put increased pressure on teacher education institutions and states to develop alternative teacher preparation programs to accommodate such individuals and allow them to play meaningful roles in schools working directly with students. The bill establishing incentive monies for local districts to hire Department of Defense personnel focuses specifically on their recruitment of such persons to teaching positions. Because of the sizeable incentive monies involved ($50,000 a person), we could expect this provision to be used extensively by local districts seeking to both recruit such personnel and to save money in the short-run.

A second set of initiatives that will be under consideration by the administration and the Congress in 1993 and 1994 center around the revision of the Elementary and Secondary Education Act (ESEA). Perhaps the most important prospects for change in the federal influence on the education of teachers are several proposals for amending Chapter I, the nation's largest single program focused on schools. There is considerable consensus among those who have advocated changes in Chapter I that its revision should include reductions in the level of regulation, encourage new approaches to instruction, and make considerably more investment in teacher and inservice teacher education. It can be expected that advocates of reform will push for more teacher training in the full range of the programs under the Elementary and Secondary Education Act, but the Chapter I provisions will be the most important.

A third concern that the Clinton administration has indicated it will pursue is the expansion of Head Start. The expansion of Head Start, however, will be opposed on the grounds that recent evaluation of the program suggests that many Head Start sites lack qualified personnel and appropriate funding for continuing professional development of Head Start professionals. It is possible, therefore, that the expansion of Head Start will carry with it provisions for program improvement, which in turn will focus on the professional preparation and continuing education of care providers. If this occurs, it will be consistent with efforts in some states to develop certification requirements for preschool teachers. If there were to be a significant infusion of monies into preschool programs, coupled with demands for better preparation and continuing training of the personnel to staff such programs, it seems safe to say that most schools of education would not be prepared to undertake such training, especially since many of the care providers do not have college degrees and would not be pursuing them.

In summary, federal efforts in recent years to influence the education of teachers do not signal major changes in the approaches that are now employed. An exception to this is the National Science Foundation's efforts to develop new approaches to both preservice and inservice teacher education. But, as we have noted, the impact of NSF programs thus far on the way schools of education and the school systems approach the education of teachers is limited, perhaps most limited in the schools themselves. In part this is because the National Science Foundation has not yet mobilized its efforts to facilitate such changes, but also because it has no theory to guide its efforts. Like most federal policies, those related to the education of teachers are the products of efforts to accommodate the many different voices with many different goals in mind. As a result, the influence of the federal government on the education of teachers is modest indeed and is likely to stay that way.

PART III

FUNDAMENTAL PROBLEMS WITH THE WAY WE EDUCATE OUR TEACHERS

The preceding two Parts of this Report suggest that in order to be effective, approaches to teacher education will need to develop teachers' capabilities to facilitate higher order learning for all children in schools and classrooms that are increasingly heterogenous and populated with children who come to school bearing the consequences of poverty and other social pathologies. Increasingly, excellent teachers will be problem solvers who can use a broad array of instructional and developmental strategies. Moreover, teachers for tomorrow's schools will need to be able to work collaboratively with teachers and other people who influence the motivation and capacity of children to learn, be able to integrate curricular topics often treated separately today, and to facilitate learning in ways that are fundamentally different from the approaches to teaching now used in most classrooms. It seems clear on the face of it that in order to do all of this, the learning opportunities for teachers must be much richer and much better linked to helping teachers help their students than is now the case.

If a system for educating teachers is to achieve the goals just discussed, it must address at least three fundamental problems: inadequate mental images of teaching and learning, discontinuity in the lessons teachers learn as they move to and through their lives, and the view that preservice teacher preparation should and can ready novice teachers to be fully effective professionais.

Inadequate Mental Images of Teaching and Learning

A major obstacle to change is that teaching is not seen as a difficult task, but one at which success is determined largely by experientially developed intuition, the extent of one's knowledge about what is to be taught, and one's commitment to students. Most policy makers do not believe that there is much about teaching that can be learned in the academy and, if the literature in defense of teacher education or the professional status of teaching is any guide, few teachers or college professors can parsimoniously articulate why teaching requires the theoretically and scientifically based learning that is the forte of higher education. Further, if good teaching is mainly the result of personal attributes and experience, there is no need to invest in sophisticated inservice education for teachers.

Most teachers have been implicitly taught, by the examples provided by the dozens of teachers who have taught them, what teaching is supposed to look like (Anderson, et al., 1992; Grossman, 1990; Mead, 1992). For the most part, these experiences fit a model in which students are sorted, told what to learn, tested to see if they can accurately retell what they were told, retold, retested, and resorted.

Unfortunately for the nation's children, this conventional model of teaching--which we will call the "teaching is telling" model-- is an unsophisticated technology that is incapable of producing the outcomes our children and our nation need. For teacher education to affect these prior beliefs and the pictures or mental images teachers carry around with them, it would have to be very powerful. Power would derive from experiencing alternative models, understanding how they differ from prior experiences, and knowing that students would learn more from teaching that embodied the new and more effective strategies. We will refer to these new strategies, which we discuss in more detail below, as "teaching for understanding."

One implication of this is that teacher educators need to model the teaching strategies that prospective teachers are being taught will be effective with students, ensure that prospective teachers see these practices being implemented in classrooms, and contrast these practices with others in an explicit effort to discredit ineffective approaches to teaching. New structures cannot be built on top of weak foundations. It is essential to remember that even if teacher educators modeled teaching for understanding in every professional course prospective teachers took, at best these experiences would be sandwiched between the teaching practices used in liberal arts and disciplinary college courses and the tacitly approved teaching practices new teachers would experience in the schools where they were initially employed. Furthermore, since new teachers are often hired in positions more experienced teachers find difficult or unpleasant, the tasks they confront lead them to fall back on simple teaching routines that seem to have worked for their former teachers and that are used by their colleagues in the school to which they were assigned.

Discontinuity in Teachers' Learning Experiences

Coherence and continuity in the lessons one is taught strongly affect what one learns. A second major obstacle to improving the education of teachers is that teachers' learning experiences are characterized by incoherence and inconsistency. These problems are well recognized and have been the topic of hundreds of commentaries stretching over several decades. What is true for the nation appears to be true for Pennsylvania as well. A state task force observed that (1) there were considerable differences among teacher education programs, (2) teacher education courses "are often not interrelated, consistent, and coherent," and (3) there was little continuity, coherence, or plan to the lessons teachers learned at various stages of their professional development (Study Team on Teacher Preparation, 1988).

There are at least a half dozen sources of discontinuity in the education of teachers:

1. institutional fragmentation,
2. different and/or inadequate theories of how teachers learn,

3. different values about what schools should do,
4. inequality in the conditions of student learning and of teaching,
5. lack of authenticity of evaluation measures and processes, and
6. absence within most school systems of a commitment to human resource development.

Most solutions to discontinuity problems, however, seem not to recognize that the incoherence and discontinuity in both the content and the forms of instruction teachers encounter are the products of core values, assumptions, and organizational structures that are central to each of the different sources of learning with major responsibilities for the education of teachers. Consider for example this classic observation by a very highly regarded keynote speaker to the 1989 meeting of the Association of American Colleges:

> Teachers' setting their own agendas--putting their individual lovingly prepared specialties on display in the curricular cafeteria, without regard to any larger end, much less any institutional plan--is what non-vocational higher education is all about. (Rorty, 1989)

Strategies to address the fragmentation of the way teachers are educated--like articulation of courses, teacher education councils, and training of on-site supervisors of practice teaching--simply do not get to the roots of the problem. For example, "coordination" as a strategy to address issues that derive from fundamental differences among those to be coordinated is the last refuge of wishful thinkers.

Anchoring the Status Quo in Preservice Goals

A third obstacle is that the education of teachers is mired in the present, entangled in the assumptions made by virtually all of the stakeholders in teacher education reform that it is the responsibility of colleges and universities to ensure that those whom they certify for teaching credentials have the necessary competencies to be effective teachers the day they begin full-time teaching.

As a recent study conducted by the Educational Testing Service (Reynolds, 1992) concludes, "Teachers, teacher educators and school administrators seem to expect newly licensed (elementary) teachers to perform in a competent manner most of the teaching tasks that more experienced teachers perform" (p. 9). Moreover, the range of essential knowledge and skills that is expected of beginning teachers is extensive. However, studies of beginning teachers show that they fall far short of experienced teachers in a number of ways (Reynolds, 1992):

- recognizing pedagogical implications of student differences in knowledge, performance and background,
- putting content taught into larger contexts,
- tailoring instruction to individual student needs,
- establishing productive relationships with students,
- planning that provides for contingencies and flexibility,
- classroom organization and discipline,
- making sense out of the complexity of classroom events and interactions,
- content-specific pedagogy; that is, why some things are more difficult to learn than others,
- instructional routines that facilitate the appropriate application of different pedagogical skills and knowledge to different tasks,
- the ability to construct explanations in response to student questions, to connect such explanations to related concepts, and to keep track of the overall instructional goals of a planned lesson,
- to focus on student outcomes as a basis for understanding the success of a lesson instead of the processes used in the lesson,
- to reflect on their own teaching.

Assigning the responsibility for preparing beginning teachers to be fully competent professionals to post-secondary institutions and the willingness of teacher educators to assume this responsibility, lead to several unhappy outcomes, including:

- false expectations on the part of teacher candidates who, after discovering that they need to know much more than they do when they take over a classroom, devalue their preservice preparation,
- the neglect of entry-level training for new teachers by school systems and, at the same time, criticisms of teacher education programs for failing to do "their job," and
- attempts to measure the quality of teacher education programs by the performance of new teachers in their first year of teaching. As we noted earlier, these measures invariably focus on narrow competencies and thus tend to trivialize conceptions of teaching. Moreover, if a teacher's success in the classroom is based on tasks they are not uniquely able to do and at which they will have great difficulty being successful, it can lead to deemphasizing, indeed to neglecting, important goals and tasks they can and should perform.

The point here is that the goal of relevance causes teacher preparation programs to try (1) to be good at the things good school systems can teach teachers to do and (2) to hire teacher education faculty based on their practical teaching experience, rather than their scholarly qualifications. This, in turn, means that the claims that higher education can make on the time given to the professional development of teachers will decline as the quality of the professionals they educate goes up. Hence the paradox: the better teacher educators get at being relevant and practical, the less necessary they become.

Tradition and Uncertainty

Accepting the fundamental barriers to making the education of teachers as productive of student learning as it needs to be does not mean that preservice teacher preparation cannot affect the quality of teaching. There is considerable evidence that teacher preparation programs positively affect attitudes and behaviors that contribute to student achievement (see Darling-Hammond, 1992a). However, most teacher preparation programs could be more effective than they are. More important, a systemic approach to the education--a re-visioning, if you will--is essential if what teachers learn in their preservice preparation is to be a foundation upon which to build professional expertise. Despite the fact that there are many ways to improve teacher education, one might imagine that the volume and persistence of criticisms of teacher education, the obstacles to improving the present system, and the self-defeating consequences of the emphasis on being practically relevant, would require basic reexaminations of the roles and functions that schools, school systems, and higher education can and should perform in the professional development of teachers. On the whole, however, this has not happened. There are several reasons for this, only one of which is the conviction that the basic plan is good and the only problems involved are those of implementation.

Many teacher educators appear ready to pursue new goals and roles but feel inhibited by uncertainty about the willingness of school systems to make a commitment to teacher learning, by state regulations in some cases, and by uncertainty about whether the new purposes and activities they would pursue would be valued, rewarded, and within their reach. School personnel and state officials, for their parts, seem to doubt the willingness of universities to adapt to new roles and to see big changes in professional development practices as more than a set of burdens adding to an already heavy load of demands for change. It follows that efforts to reform, much less re-vision, the education of teachers must be a collaborative and systemic effort.

In Part V, we describe what a substantially restructured system for educating teachers might look like in Pennsylvania. We turn now to an evaluation of major proposals for improving key strategies now in place.

PART IV

EVALUATING PROPOSALS TO IMPROVE TEACHER PREPARATION

Our thesis is that the challenges that must be addressed in educating teachers are so great that improving present approaches will fall short of meeting Pennsylvania's needs. But there are numerous efforts underway to improve teacher education and these vary in their likely effect. While we seek to encourage changes in the education of teachers that aspire to new goals and assign new roles to those who influence teacher learning, preservice teacher preparation can be improved by modifying existing policies and practices. Teacher preparation does make a difference in the attitudes, behaviors, and predispositions of beginning teachers now (Evertson, Hawley & Zlotnik, 1985; Darling-Hammond, 1992b). It is reasonable to assume that the work being done to prepare teachers can be done better, and that this will influence the quality of teaching that children experience.

In this Part, we examine several strategies for reform that are most often proposed by public policy-makers or educators committed to change and discuss what is known or can be estimated about their consequences. Based on this analysis, we identify some priorities for unapproving teacher education in Pennsylvania as well as some less costly or less controversial proposals that appear to be promising. We conclude this section by discussing why these useful improvement strategies, in themselves, are insufficient to overcome key structural and conceptual problems of the current constellation of arrangements for educating teachers that we identified in Part III and to reshape teaching and learning in ways we discussed in Part I.

There have been several reports dealing with the preparation of teachers in Pennsylvania (Benedetti, 1989; Pennsylvania Association of Colleges and Teacher Educators, 1992; Pennsylvania State Education Association, 1992b; Professional Standards and Practices

Commission, 1993; Study Team on Teacher Preparation, 1988). We cannot comment on the many recommendations and observations in these studies. In some cases, we draw attention to some of the proposals made to help us make a particular point. The absence of references to points made in this report does not imply either approval or disapproval of their recommendations.

Teacher educators have endorsed many of the reforms discussed in this section, as well as other more technical changes (Benedetti, 1991). Like their colleagues in other states, the reforms proposed by teacher educators in Pennsylvania appear to assume that incremental changes in the roles played in the professional development of teachers by schools and departments of education will be sufficient.

Strategies to improve teacher education fall into roughly three categories: (1) efforts to improve the academic preparation of teachers, (2) efforts to improve the preparation programs themselves, and (3) efforts to improve entry to teaching through both improved practice teaching experiences and the establishment of induction programs. We briefly examine each of the several strategies within these broad categories.

Improving the Academic Preparation of Teacher Candidates

Establishing Entry Tests for Teacher Preparation Programs, Certification and Licensure.

By 1991, 45 or more states had adopted pencil and paper tests dealing with one or more of the following topics: basic skills in communication and computation, knowledge of subject matter to be taught, general knowledge, and professional knowledge. While there is widespread agreement that teachers should be well educated and should have certain basic skills and knowledge of the subjects that are to be taught, it is not clear whether the tests that are used effectively discriminate between teachers who will facilitate student learning and teachers who are unlikely to do so.

Those studies seeking to correlate teacher candidates' scores on such tests with teacher performance or student test scores have shown inconclusive results. There is some evidence that teachers who score well on tests of verbal skills also are judged to be effective teachers and that their students perform better on their own standardized tests. Again, however, the question of what the cutoff point should be cannot be determined from the existing research. The most widely used test for entry to teaching is the National Teachers' Examination (NTE). Several studies have shown no relationship between prospective teachers' scores on the NTE and their evaluations by supervisors or the performance of the students they teach when they enter the profession. This and other criticisms of the National Teachers' Examination have led the Educational Testing Service, the author of the NTE, to redesign the examination. This process, now nearing completion, is intended to yield a test which focuses on the ability of prospective teachers to apply knowledge to problems they are likely to confront in the classroom.

The fact that researchers are unable to find strong links between conventional tests administered to prospective teacher candidates and either teacher performance or student learning does not mean that it is unimportant for prospective teachers to know how to communicate, compute, and to know the subject that they are about to teach. What it does suggest, as we will discuss later in this Report, is that such knowledge, at least as it is determined by norm-referenced and criterion-referenced tests of the sort used, is not sufficient to ensure effective teaching.

As of the late 1980s, 11 states used observational assessments of beginning teacher performance as a basis for determining their full licensure. Most experts seem to agree that such performance assessment is a reasonable process to determine the quality of beginning teachers, but there is considerable disagreement about the efficacy of the mechanism as used in most states and whether it should be used to assess teacher preparation programs. (We return to this last concern later in this part of the Report.) Critics of performance tests (see Wise et al., 1987) argue that these performance tests often are checklists of teacher behaviors which may or may not be appropriate in the particular context in which they are assessed, and moreover, need to be assessed not as individual acts, but as a set of interrelated actions whose effectiveness is determined by the context and by the subject being taught. Many teacher educators express concern about particular rating instruments because they focus on narrow competencies and constrain teacher education programs from pursuing efforts to enrich the preservice curriculum and to develop prospective teachers' capacity for problem-solving and professional growth.

Some teacher educators express concern that basic skills tests discourage bright students because they imply that their potential colleagues may not be very intelligent. Tennessee has addressed this concern by waiving the basic skills tests for teacher candidates with above average scores on the Scholastic Aptitude Test or the American College Test.

Increasing Academic Standards for Admission to Teacher Preparation Programs

Many states, and even more teacher education programs, motivated by standards of the National Council for the Accreditation of Teachers (NCATE), have established minimal grade point averages, usually 2.5 on a 4.0 scale (i.e., C+), for entry to teacher education programs. Even before such standards were widely implemented, several studies comparing the grade point averages of prospective teachers with other undergraduates demonstrated that the average teacher education student compares favorably (National Center for Educational Statistics, 1990). Skeptics argue that one reason for that is that students in teacher education take less demanding curricula and grading policies in education courses are less rigorous than in more "academic" courses. In any event, the introduction of grade point average minimums have increased the academic qualifications of the teacher candidate pool (Hawley, Austin, & Goldman, 1988).

Murnane and his colleagues (1991), however, have found that the more academically proficient new teachers are, the more likely they are to leave teaching in their first year of service and the less likely they are to enter teaching at all. Two explanations for this are that (1) highly qualified students have other employment options, or (2) lack of interest in such candidates by school districts. In many situations, school systems are slow to make offers of employment so that students with other options choose those other situations. In addition, the difficulties of first-year teaching and the low rewards of teaching lead the most academically talented to leave the profession in disproportionate numbers (Murnane et al., 1991; Schlechty & Vance, 1983).

Contrary to predictions by some observers, the introduction of higher grade point average standards and entry tests has not reduced the number of persons interested in preparing for teaching, although factors other than the standards may be the cause of this. Between 1982 and 1990, the proportion of college freshmen expressing interest in teaching nationally rose from 4.7% to 9%. Enrollment in teacher education programs throughout much of the nation grew dramatically. The notable exception to these trends has been the enrollment of minority students in teacher education programs. Several states have adopted programs to recruit and retain minority teacher candidates and to ensure that they obtain employment once they are licensed. The effect of these programs has yet to be determined. All current reports suggest a continuing crisis in the number of minority persons seeking to become teachers--nationally the proportion of teacher candidates who are persons of color is something less than 5%. In Pennsylvania, the percentage of teacher candidates who are persons of color is not reported in state data but the proportion appears to be very small. In

1988, only 100 black teacher candidates applied for certification (Study Team for Teacher Preparation, 1988).

Increasing Teacher Salaries

Many observers of the pool of teacher candidates have argued that the quality of teacher candidates is significantly tied to teacher salaries and that major changes in the academic qualifications of teachers will naturally follow from increasing teacher salaries. In the previous section, we examined the evidence and theory on this point. We suggested that a targeted strategy for increasing teachers' salaries given the high cost of substantial salary increases for all teachers, will have limited effects, particularly if it is the only approach.

Alternative Certification

During the mid-1980s, it became increasingly popular to argue that one of the reasons why academically qualified people did not enter teaching was that teacher preparation programs and the certification processes associated with them unnecessarily discouraged persons from teaching who would be excellent teachers, including persons of high academic qualifications and persons with significant experience in other occupations (i.e., such as the military or business). By 1990, between two-thirds and four-fifths of all the states had adopted some form of alternative certification.

The advocates of alternative certification programs argue that conventional teacher preparation programs have little effect on the quality of teacher performance or teacher effectiveness. There are, however, a number of studies that find otherwise (Hawley, 1992; Darling-Hammond, 1992b).

Though alternative certification programs varied widely in their structure, scope and intent, one can conclude from the existing evidence that alternative certification has had the following effects. First, it has resulted in relatively few teacher placements, except in two or three states, and the popularity of alternative certification programs, measured by the proportion of newly appointed teachers selected from the ranks of teachers so certified, has changed little over the existence of these programs. Second, the scope of the programs has been broadened from fields where there are teacher shortages to include other fields, although it remains the case that alternative certification programs in many states are restricted to certain types of positions. Third, greater numbers of older persons with some job experience and persons of color tend to be recruited to teaching through alternative certification programs than through conventional programs. Fourth, the scope and quality of preservice professional preparation to teach in alternative certification programs is modest at best and tends to focus on the development of discrete skills. Most studies show that the mentoring process that occurs during the first year of teaching, which is usually an integral part of alternative certification programs, often falls far short both in the amount of time new teachers are mentored and the quality of the mentoring that advocates of alternative certification say should be provided. Fifth, alternative certification apparently has reduced the number of temporary certificates issued in districts that experience chronic teacher shortages, such as some major urban school systems. On a whole, observers believe that persons certified through alternative certification are better qualified than persons certified through temporary means. Sixth, universities and colleges are more likely to be involved in alternative certification programs than was the case at the outset of such programs.

The effect of alternative certification programs on the quality of teacher preparation and the qualifications of persons entering teaching have yet to be definitively determined. The number of available studies are quite small. On the whole, they can be read to argue that programs with university involvement seem to produce novice teachers whose performance is judged to be as competent as those who are certified in conventional programs although almost all beginning teachers are rated highly. On the other hand, there is reason to believe that those prepared to teach in conventional certification are able to contribute earlier in their careers to student performance to use a broader repertoire of teaching strategies (Darling-Hammond, 1992b). The available evidence also suggests that alternative certification programs focusing on second (or third) career recruits to teaching should be assessed differently than those aimed at recent college graduates and that the former will produce more positive outcomes than the latter (Hawley, 1992).

Two recent developments at the national level are likely to keep alternative certification high on the education reform agenda. First, President Clinton's call for a National Service Corps, which would allow students to repay college loans by teaching or assisting teachers, will strengthen the hand of alternative certification advocates. Second, and more directly, congressional authorization of a Defense Teacher Corps Program in 1992 encourages Defense Department and defense contractor personnel terminated by defense spending cutbacks to pursue alternative teacher certification and pays school systems up to $50,000 to hire these people in teaching positions.

In Pennsylvania, the alternative certification program has apparently attracted relatively small numbers of teacher candidates. In our interviews with persons in Pennsylvania, we found that some attributed the modest impact of the program to its excessive restrictions with respect to who is qualified to enter alternative certification and the amount of college-based learning that they must experience. On the other hand, we also heard criticisms of the program from teachers and teacher educators who argued that it undermines efforts to professionalize teaching.

Improving Teacher Education: Efforts to Change the Structure, Content and Processes of Preservice Teacher Preparation Programs

Despite the evidence that professional preparation tends to lead to teacher effectiveness and the probability that teacher preparation programs, on the whole, are better than they had been before, efforts to reform American education by reforming teacher education have continued to be high on the agenda of many policy-makers. They have also generated a number of substantial proposals for programmatic and structural change among teacher educators. It is somewhat difficult to generalize about the considerable range of policy responses to criticisms of teacher education or to admonitions that teacher education is a relatively low cost educational improvement. But, in general, the proposals of policy-makers appear to reflect beliefs that preservice teacher education is typically guilty of one or more of three limitations or weaknesses: (1) it is unnecessary and represents a burden that prospective teachers should not be asked to bear, (2) teacher education is insufficiently substantive; that is, that it does not deal sufficiently with the content of what is to be taught, and (3) that it is insufficiently practical in the sense that beginning teachers lack basic teaching competencies (e.g., the ability to manage their classrooms). The most frequent responses by policy-makers to these concerns have been: (1) program approval and certification requirements, (2) restricting the number of education courses that may be taken or eliminating undergraduate education majors, (3) the introduction of alternative certification measures, (4) requirements that teachers major in an academic discipline and have a strong liberal arts background and increased requirements for field-based courses and/or more time for student teaching, and (5) holding programs accountable for certain outcomes.

In an effort to respond to the criticisms and to the policies that have followed from them, and in response to concerns over the need to professionalize teaching, teacher educators have pushed a number of program changes. The most widely discussed of these appear to be: (1) strengthening program approval and accreditation, (2) strengthening teachers' abilities to teach subject matter knowledge, (3) changes in curriculum and instruction to nurture "reflective teaching" by developing prospective teachers' capacity and commitment to engage in inquiry and reflection in the context of practice, (4) improving prospective teachers' opportunities to develop teaching competencies in schools, and (5) extending preservice teacher preparation beyond the college experience.

In this section of the Report we briefly discuss each of these types of proposals for improvement. We note, however, that some of these developments are more widely discussed than they are implemented and that there is no systematic evidence on how widely employed these different strategies for either constraining or enhancing teacher preparation really are.

Ensuring Quality: Traditional Program Approval and Certification Requirements

Traditionally, states have sought to assure the quality of teacher preparation programs in two ways--through state approval of the programs themselves and through the introduction of specific course requirements and provisions for practice teaching. In most states, the state approval is not particularly rigorous and falls short of the demands on programs that are usually made by the National Council for the Accreditation of Teacher Education (NCATE). On the whole, state approval does not appear to be a promising strategy for improving the quality of programs. It sets minimal standards that indeed are minimal. State certification requirements vary enormously from state to state suggesting that there is no consensus on what it is important for prospective teachers to know and be able to do that can be reflected in course requirements. Critics of the course requirements approach to controlling or enhancing program quality argue that they are too restrictive; they require things to be learned that are less essential than others; and they discourage innovation.

Several states have moved to deregulate teacher education and to substitute instead certain guidelines and goals that affect the approval of programs rather than the certification of particular candidates. In these deregulating systems, students who graduate from approved programs are either preliminarily licensed or fully licensed upon their exit from approved programs independent of specific courses that they may have taken and program approval is not determined by the courses students are required to take. It is too early to tell what the effects of such deregulation efforts have been on the quality of persons entering the profession and innovation in teacher education programs themselves. Deregulation, however, has been one influence on an apparently growing interest in outcome-based standards for teachers and teacher education.

Ensuring Quality: Developing Outcome-Based Standards for Teachers and Teacher Education

In the last 5-6 years, there has been growing interest in the possibility of basing teacher licensure and certification and the approval and accreditation of teacher preparation programs on assessments of what teachers know and are able to do. These purposes of outcome-based measures are sometimes confused. We treat them separately. One state, Tennessee, has mandated that teachers be assessed in terms of gains their students make on standardized tests, but we will not discuss this development.

Standards for Initial Teacher Licensure and Certification. Most states have used forms of outcome-based assessment in licensing beginning teachers in that they have used performance on paper and pencil tests to screen prospective candidates. The validity of these measures, however, is doubtful for reasons discussed earlier. A small but growing number of states have begun to distinguish between initial and "full" licensure with the latter being dependent on assessments of their performance in the classroom. Criticisms of such performance assessments focus on the narrow and mechanistic measures and the ways they are used (Brophy, 1988; Darling-Hammond & Berry, 1988).

There is no widely agreed-upon process for evaluating the performance of beginning teachers. Lee Shulman has identified four general principles that we agree should guide the design of systems for evaluating beginning teachers:

1. Assessments should be content and context specific.
2. Evaluation should be extended over time and not limited to evaluating small segments of teaching.
3. Evaluation should link teaching to student learning.
4. Teachers being evaluated should be able to select evidence to document their work with students (see Hawley, 1993).

By the end of the 1980s, several states had established "Professional Standards Boards" (PSBs). On most such boards, teachers are a majority of the members. The functions of PSBs differ widely from state to state, but usually exceed the roles and authority assigned to Pennsylvania's board. Among the roles typically assigned to PSBs is the creation of rules or guidelines for teacher certification and licensure and for the approval of teacher education programs. So far as we can tell, there has been no systematic study of the impact of PSBs on improvements in strategies to educate teachers.

In the last half of the 1980s, the National Board for Professional Teaching Standards (NBPTS), a private teacher-dominated organization, was established with support of the Carnegie Corporation and other foundations. The federal government began to support research and development activities of the Board in the late 1980s. The NBPTS aims to develop a voluntary system for certifying teachers at advanced levels thereby defining what effective teachers should know and be able to do.

While the NBPTS seeks to certify experienced teachers at advanced levels, its work may influence teacher education in at least two ways. First, the standards developed for advanced assessment may provide the framework for developing standards for initial certification and licensure. Some states are pursuing this direction, including Oklahoma and Georgia. A development, deriving at least in part from the NBPTS, that seems likely to influence teacher preparation programs throughout the country is a project being undertaken by the Interstate New Teacher Assessment and Support Consortium (INTASC), which is being coordinated by the Council of Chief State School Officers. INTASC has developed an elaborate set of model standards (INTASC, 1992) and has been trying to determine the extent to which consensus on these standards can be attained.

A second way that NBPTS may affect teacher education is through its efforts to influence training to meet the advanced certification standards. In part because it does not trust the quality of many schools of education, and in part because it wants to create incentives for teachers to seek advanced certification, the NBPTS has been considering the establishment of training centers, perhaps at universities and perhaps not, which would focus on the developing teachers' abilities to be Board certified. The proposal being discussed would provide that "courses" taken in such centers would satisfy local and state requirements for salary increases.

Holding Teacher Education Programs Accountable for Outcomes. As we noted above, the traditional ways that states and education professionals have sought to ensure the quality of teacher education programs have been to insist that they embody certain processes. This focus on processes has become a major grievance for those who want to encourage innovation in teacher preparation.

In response to this concern, and in some cases to policy-makers' frustrations that reforming teacher education has not led to school improvement, a number of states have moved to consider or implement Outcome-Based Teacher Education (OBTE). There is no evidence of the overall reaction of teacher educators to these relatively new initiatives, but it seems reasonable to surmise that debates about OBTE will focus on the specific outcomes for which teacher education should be held accountable.

Proposals for OBTE essentially define three types of outcomes:

1. what prospective teachers know and are able to do as they leave the teacher preparation program or as they enter their first teaching positions,
2. assessments of beginning teachers' performance measured by principals, mentors, or other observers, and
3. student gain scores on standardized tests.

Our judgment is that teacher educators should be held accountable for achieving certain outcomes whose definition and measurement are the product of discussions among the major stakeholders. These outcomes should accurately reflect the purpose of preservice education and the limits of its influence. There are several reasons why OBTE that uses measures of teacher performance or of student learning as the criteria for assessing teacher preparation programs are inappropriate, if not counterproductive:

1. This would violate the first principle of accountability--people and organizations should not be responsible for outcomes over which they have little or no authority.
2. Workplaces are more influential sources of learning job-related skills than are colleges and universities.
3. The factors that influence student learning and teacher behavior are not only beyond the control of teacher educators, they vary enormously from school to school. We know of no formula or statistical technique that can "control" for these influences.

4. The use of methods commonly employed to assess teacher performance will cause teacher education to:
    a. define teaching in terms of specific skills and techniques that have weak relationships to the learning of higher order skills,
    b. anchor teacher education in conventional practice, (which reformers of teacher education want to change), and
    c. discourage professionalism among teachers.
5. Assigning the blame or credit for teacher effectiveness to schools of education will discourage schools and school systems from developing effective induction programs for beginning teachers.

In Part V of this Report we describe several outcomes for which teacher preparation programs in Pennsylvania might be held accountable and some ways of both achieving and assessing these outcomes.

Constraining the Amount of Pedagogical Study Required of Undergraduates Who Seek to Become Teachers

Some states, most notably Texas and Virginia, have limited the number of course credits in education that undergraduates may take to satisfy requirements for the baccalaureate degree. A related response to the concern that teacher preparation is either ineffective or lacks the academic rigor of other undergraduate course work has been the requirement that prospective teachers take the same number of general education and disciplinary major courses as other undergraduates. Both of these developments have the consequence of pushing many teacher education programs into a fifth year of college-based preparation, especially when certification or licensure to teach in elementary schools or special education is involved. These efforts to constrain teacher preparation, and those to formally move it beyond the baccalaureate program--that we discuss further next--are relatively recent developments, and there is not evidence yet of their effects on either the quality of the candidates who are teaching, or on the effectiveness of the teachers who are products of these changes.

Strengthening Teachers' Abilities to Teach Subject Matter

Requiring Prospective Teachers Know the Subjects They Will Teach.

There is no disagreement about the premise that underlies the reforms that emanate from this concern. The question is whether the strategies that are used--namely requirements that students major in an academic discipline other than education or that they pass subject matter tests of knowledge--are sufficient or appropriate to meet the concern. Most teacher preparation programs require students who would be licensed to teach in secondary schools, and in some cases middle schools, to major in an academic discipline or to take an equivalent number of hours in that discipline.

Requirements that all students preparing to teach at whatever level major in an academic discipline, such as requirements in California, Tennessee, and elsewhere, seem to reflect concern about how well educated teachers are rather than whether they can teach their subject matter since elementary teachers teach many subjects and may, in meeting requirements of an academic major, learn less about some of the subjects they must teach than they do when they were required to take a more broadly based undergraduate curriculum usually required for a major in elementary education.

Studies of the relationship between majoring in an academic discipline or subject matter knowledge on the one hand and teacher performance on the other suggest that persons who major in a discipline are no better able to teach that discipline to students than are students who major in education and have a considerable number of courses in the related field (National Center for Research on Teacher Learning, 1992). Efforts to correlate the number of courses taken and the grades received in those courses with assessments of teacher performance or student scores on standardized tests have not discovered strong relationships. The more sophisticated the tests of knowledge are, the more likely the prospective teachers' scores on such tests are likely to correlate with gains in their students' academic performance (Hawley, 1991). This research, which invariably focuses on secondary teachers, suggests that knowledge of subject matter is not in itself sufficient to ensure effective teaching in most situations. We return to this general issue below in our discussion of "content pedagogy" and subject matter knowledge.

Linking Knowledge of Subjects and Effective Pedagogy. As we noted above, there is convincing evidence that having studied the subject in depth does not in itself enable a person to teach effectively (Ball & McDiarmid, 1990; Kennedy, 1990). Teacher knowledge of subject matter, as it is taught and tested in high schools and colleges, does not appear to get to some core aspects of subject matter knowledge that researchers believe are important to effective teaching. Three examples of core aspects of such knowledge are: (1) the changing facts, concepts, and principles or laws related to the subject; (2) the organization and structure of the subject, the patterns of relationships among facts and ideas within the discipline; and (3) methods of inquiry, the set of assumptions, rules of evidence, and forms of argument that influence how knowledge about a subject has been and is developed (cf. Kennedy, 1990). These central questions appear to be related to the ability to understand why students have trouble learning a subject and how best to look at that subject through different lenses. Prospective teachers who have that capacity are said to have mastered "content pedagogy." Researchers believe that knowledge of content pedagogy enables teachers to ask questions, provide examples, use metaphors, and otherwise give meaning to the subject being taught thus make it more understandable, worth remembering, and useable to the students involved (Kennedy, 1990; Shulman, 1987).

While there is growing agreement among teacher educators that mastering content pedagogy will increase teacher effectiveness, there is little evidence to support that conclusion, and few schools of education are now engaged in the teaching of content pedagogy. One of the problems in teaching content pedagogy is that it involves the integration of content and method. Increasingly, prospective teachers are expected to learn content in their liberal arts and disciplinary majors and to learn methods in their professional courses. Most observers of teaching of content in the liberal arts and disciplinary courses appear to agree that three core questions identified above are not often engaged in the undergraduate curriculum.

We noted above that several studies indicate that teachers who are certified in traditional preparation programs tend to be evaluated by observers as being more effective than are teachers who have not had preservice training. At the same time, there is also evidence that exposure to teaching methods courses themselves do not enable teachers to explain complex concepts (National Center for Research and Teacher Learning, 1992). Hence, the growing interest in content pedagogy.

Inquiry-based Teacher Preparation

While inquiry-based teacher preparation has not been widely implemented, this approach is increasingly popular and has gained momentum from several sources: (1) interest in professionalizing teaching and creating a professional culture in schools by supporting teachers in working together (i.e., Lieberman, 1988; Evertson & Murphy, 1992), (2) more dialogue about what teacher preparation institutions can realistically be expected to do and do well (Hawley 1994), and (3) growing interest in expanding the notion of how we come to "know" and the importance of teaching thinking and problem-solving (Resnick, 1987; Shulman, 1987).

The combination of these and other factors have led to the trend toward engaging preservice teachers in a more reflective orientation to teaching focused on solving problems that arise in the course of learning to teach (Clift, Houston, & Pugach, 1990; Schon, 1987; Zeichner & Liston, 1987). Stressing the importance of reasoned explanations for educational actions has the potential for making preservice teachers more aware of their own practices, of the matches and mismatches between belief and action, and what their students are actually learning. Although actual programs are far from the norm, there are some exceptions: Michigan State University (Feiman-Nemser); the University of Wisconsin (Zeichner, Liston, et al.), the University of Virginia (Wildman, Niles, et al.); Catholic University (Taylor & Valli, 1992); and Alverno College. (For a discussion of further examples, see Liston and Zeichner, 1991.)

Of particular relevance to teacher education initiatives in Pennsylvania is the work underway at the University of Pennsylvania and at Shippensburg State University. Project START (Student Teachers as Researching Teachers) is a school-university collaborative teacher education program at the University of Pennsylvania that involves groups of experienced and beginning teachers who meet regularly to write, read, problem-solve, and ask a wide variety of questions about theory and practice (Cochran-Smith & Lytle, 1990). In this project, teacher educators, experienced teachers, and preservice teachers form teacher-researcher teams to study learning and teaching in single classrooms. What preservice teachers learn are the intellectual frames of experienced teachers who in turn examine and develop their own interpretive strategies. At Shippensburg State University, the teacher education faculty is working with local schools to implement the basic principles of the Coalition for Essential Schools.

Increasing Prospective Teachers' Teaching Competence:

Increasing Preservice Practical Experience

Policy-makers who doubt that prospective teachers can learn to teach in college classrooms, but who believe that teaching technique is important, have sought to increase the number of hours and weeks that students spend learning to teach in actual schools. These beliefs, coupled with the beliefs of many teacher educators that they must respond to concerns that beginning teachers are not ready to accept the responsibility for the classrooms to which they are initially assigned, have led to substantial increases in the amount of time prospective teachers invest in field-based courses and to the extension of practice teaching in many cases to at least a semester long experience prior to initial licensure.

Field-based Courses. In a fifteen-year span between 1968 and 1983, the field experiences component of professional education increased almost 67% (Johnson, 1968; Heald, 1983). A study of teacher preparation institutions in 15 states in the South and Southeast conducted in the late 1980s found that almost two-thirds reported an increase in field requirements. One-third of these institutions listed increases in the amount of time that teacher candidates spend in the field as their most important change in the preparation of their teachers (Hawley, Austin, & Goldman, 1988).

The conviction that prospective teachers should spend more time in "real" classrooms learning to teach is supported in part by the fact that preservice teachers consistently list field-based or practice teaching as their most valued experience (Griffin, 1986; Feiman-Nemser, 1983; Goodlad, 1990).

As the teacher education curriculum has become more practical in its orientation in many universities and colleges, so-called foundation courses have dropped by the wayside (Goodlad, 1990). While the research on the subject is not conclusive, the available evidence suggests that increasing the amount of preservice time that students spend in the classrooms given the typical types of assignments that they are given both in field-based courses and practice teaching will have limited effect indeed (Evertson, Hawley, & Zlotnik, 1985). There is some evidence that after the third or fourth field-based course, the effects on teacher disposition and professional knowledge actually declined (Malone, 1985).

Likely explanations for the somewhat surprising findings on the limited contribution field-based experience makes to the education of a teacher include:

1. Inability of beginning teachers to process all of the different lessons they are learning and the absence of time in the preservice curriculum to reflect effectively on the lessons being witnessed and to understand the theories which would explain the relative effectiveness of different teaching strategies.
2. Prospective teachers have limited exposure to new and innovative teaching practices (Tabachnick, Popkewitz, & Zeichner, 1979-80; Clifton, 1979).
3. The "dailiness" of schooling with its emphasis on the structure of the school day, the predetermined curriculum, the adherence to precise schedules and its focus on order and control can mean that student teaching is a question of "survival in a marginal situation" (Clifton, 1979).
4. The assumption by teacher candidates of a circumscribed role in the classroom encourages passivity and allows for only a narrow range of experiences to learn to teach and isolation from other school activities (Griffin, 1986).
5. The fragmentation and lack of clarity of purpose between the university or college and the local school (Sarason, Davidson, & Blatt, 1986).

Practice Teaching and Professional Development Schools. While teacher educators and beginning teachers agree that practice teaching is an essential part of their preservice training, the evidence on its effectiveness is not encouraging. There is some reason to believe that, during the practice teaching experience, teachers actually unlearn some of the more complex strategies that they learned and were able to demonstrate in their course work, and to have become increasingly focused on controlling students rather than facilitating their learning of content (Hawley, 1991). This evidence and the difficulties of placing large numbers of students in environments that did not often support the practice teacher or the cooperating teacher, or over which the school of education had little influence (and which therefore might teach student teachers very different lessons from those that they learned in the preservice program) has led to an interest in the development of special school settings in which practice teaching would occur. These special settings are similar in their intent to laboratory schools, once popular and now mostly abandoned by schools of education, but are importantly different in that they are public schools. These special settings, which usually serve diverse populations of students, are called by various names including clinical schools, professional practice schools, and most commonly, professional development schools.

Professional development schools are seen by their proponents to have multiple purposes that go beyond the training of preservice teachers to include an environment in which to conduct research on innovative teaching strategies and as centers for the professional development of career teachers. However, in most cases, professional development schools now being implemented are limited in their scope to the preparation of student teachers or as sites for internship programs. There is no systematic evidence on the comparative advantage of professional development schools over more traditional approaches to student teaching, but virtually all observers of these situations attest to their relative effectiveness. It appears that most schools of education are either engaged in some form of clinical or professional development school or have such a school in their plans.

Extended Teacher Preparation Programs. Even before discussions took place among policy-makers about the desirability of constraining the amount of undergraduate credits that students preparing to be teachers would be allowed to take, some teacher educators, especially those at research universities (e.g., The Holmes Group), had been proposing that preservice teacher preparation be extended to at least five years. These proposals fall into two general categories. One calls for extended programs, meaning that the undergraduate teacher education curriculum would include both undergraduate and graduate instruction and therefore encompass more than one year of professional preparation. A second type of proposal, the so-called fifth-year programs, are based on the premise that professional preparation should begin only after students have completed a conventional baccalaureate degree. Indeed, the initial proposal of the Holmes Group (1986) urged two years of postbaccalaureate teacher preparation.

Advocates of extended and fifth-year programs argue that they will result in more rigorous academic and professional preparation and that this is necessary both to ensure that teachers are well educated and that they can learn the increasingly large body of professional knowledge and skills that research has identified over the last several years as the source of effective teaching (cf. Houston, 1990; Reynolds, 1990). Critics of the fifth-year and extended programs argue that increasing the amount of time and money that prospective teachers need to invest in preparation for a career will result in a decline in the quality of teacher candidates because of the opportunity costs involved with entry into the profession compared to other professions (Hawley, 1988; Murnane et al., 1991). Fifth year programs also have been criticized on the grounds that they would discourage the integration of content and pedagogy that is often seen in strong liberal arts colleges in those universities that once served as normal schools with the primary mission of training teachers. In fact, the Study Team on Teacher Preparation (1988) recommended to the Pennsylvania Board of Education that teacher preparation should involve the integration of liberal arts and pedagogical courses. We note how difficult this is to do unless teacher candidates are taking substantive courses while they learn about pedagogy.

No state other than California now requires either five years of training or a master's degree before initial certification (in California, this provision has been on the books for about 30 years). On the other hand, there is a modest movement among teacher education institutions to adopt five year programs and a number of institutions offer only post-baccalaureate teacher preparation.

There is no evidence that the requirement of an additional year of college-based teacher preparation will either reduce or improve the quality of persons entering the profession. During the late 1980s, when such provisions gained increasing popularity, teachers' salaries increased substantially and other employment opportunities declined. There is also no evidence to support the premise of advocates of extended teacher preparation that the additional year of preparation enhances the effectiveness of beginning teachers.

Induction: Learning on the Job?

Most beginning teachers are faced with "reality shock" (Veenman, 1984) as they assume full responsibility for a classroom full of students on the first day of school. They are often overwhelmed by the relatively simple tasks of teaching such as classroom management, paper work, and lesson planning, and find little time or encouragement to worry about teaching for understanding, using cooperative learning, or other approaches to facilitating learning that transcend the transmission of knowledge and skills. Few occupations put novices in the jobs veterans find too difficult and unrewarding. Unsupported beginning teachers often are expected to "sink or swim" during those first few critical years of teaching (Hall, 1982; Huling-Austin, 1990; Lortie, 1975).

During the past ten years, almost two-thirds of the states, including Pennsylvania, have enacted formal teacher induction programs to support and assist beginning teachers.

Although these programs are varied, Huling-Austin (1990) found the following common goals for most induction programs:

1. to improve teaching performance,
2. to increase the retention of promising teachers during the induction years,
3. to promote the personal and professional well-being of beginning teachers by improving teachers' attitudes toward themselves and the teaching profession,
4. to satisfy mandated requirements related to induction and certification, and
5. to transmit the culture of the system to beginning teachers (p. 539).

There is little doubt that a well-designed and well-implemented induction program contributes to the retention of teachers, facilitates the development of positive attitudes toward teaching and, when focused on enhancing professional skills, can improve teachers' performance (though evaluations of induction programs do not carefully assess gains made in teaching effectiveness) (Feiman-Nemser & Parker, 1992; Huling-Austin, 1990; Klug & Salzman, 1991; Yosha, 1991). Several studies show that without adequate support, first year teachers begin to doubt their own effectiveness and decisions (Brooks, 1986; Odell, 1986; Summers, 1987).

While the research on induction shows positive results on the whole, comparisons to teachers without support during the first year of teaching is a modest standard. Most studies, moreover, deal with experimental models rather than the average experiences of beginning teachers in induction programs.

The key to effective induction is the character of mentoring involved and the degree of continuity between preservice learning and the lessons beginning teachers learn on the job. There is evidence that the quality of mentoring beginning teachers receive varies enormously, even when the program is mandated and essential to certification. Further, the financial commitments of some states and many districts to the support of mentoring seem to fade over time. Few programs appear to consciously develop teachers' professional capacity and many of the efforts that do have a training component focus on narrow skills or district and state approved instructional techniques. Developing or supporting teaching for understanding is not the goal of most induction programs.

The most consistent finding across induction studies is the importance of the mentor teacher. The assignment of an appropriate support teacher is likely to be the most powerful and cost effective intervention in an induction program (Huling-Austin, Putnam, & Galvez-Hjornevik, 1986, p. 50). Once the mentor teacher is assigned, many questions still remain. What is the mentor expected to do and how does the mentor gain the necessary understandings and practices with which to work with this beginning teacher? Programs for educating mentors for these roles have also been developed based on assumptions about these critical understandings and practices, but the range of programs is wide and the length and comprehensiveness of such programs vary from hearing a luncheon speaker to participating in in-depth, inquiry-based seminars over a sustained period. To date, programs for mentors have been developed to answer questions that their developers believe to be important, resulting in a wide range of training models with only modest agreement about the veteran teacher's role (Odell, 1990).

Most training models lack a much needed conceptual base linked to theories of how teachers learn. The five level model proposed by Gray and Gray (1985) is one exception to this generalization. It describes a continuum of mentor roles as they change during the relationship between mentor and protege. The mentor begins as a giver of advice and follows the stages of the beginning teacher's development to the point at which the beginning teacher is self-directed. More recently, research on how teachers learn to collaborate and to mentor others suggests that there are complex problems and critical junctures in the process that require support and reflection in order for the mentoring relationship to be sustained (Evertson, Wade, & Smithey, 1993).

Beginning teachers often experience lessons that are inconsistent with or contradictory to those they experience in their preservice preparation programs. When this occurs, most beginning teachers abandon their preservice knowledge and skills even though the preservice lesson was well supported by research and the prospective teacher had the opportunity to practice the technique (Griffin et al., 1983). Very few induction programs are designed as a next stage in the professional development of teachers and build specifically on preservice learning (Feiman-Nemser & Parker, 1992). Even where state programs provide a role for university faculty (e.g., Oklahoma, Kentucky, and California), university involvement is very limited and may, for logistical reasons, be disconnected from the actual courses, techniques, and theory the prospective teacher experiences before entry to the profession.

Some advocates for mentoring programs believe them to be opportunities for professional development and for determining whether teachers should be retained and given full licensure. However, most districts retain virtually all teachers they have and formally give almost all new teachers very high evaluations, suggesting that not much screening goes on in induction programs (Hawley, 1992).

There are outstanding induction programs in particular school districts. Those in Albuquerque, Louisville, Toledo, Lafayette, Indiana (Summers, 1987), and some California districts appear to reflect most of the characteristics of effective induction advocated by researchers. But such programs are expensive and require significant changes in schools. They are, literally, exceptional.

Our review of the program descriptions (Pennsylvania Department of Education, 1993b) and our interviews with teacher educators, teachers, and state officials in Pennsylvania indicate that induction programs in most districts are inadequate. Programs are typically underfunded, mentors may or may not be trained and rewarded, new teachers are evaluated in the same ways more experienced teachers are evaluated, and learning opportunities may or may not be available to address needs beginning teachers have for professional development. Moreover, linkages between institutions of higher education and either beginning teachers or their mentors is, at best, a sometimes thing.

Lessons from Other Countries?

In the preceding pages of this Part, we have been trying to identify the lessons for improving the education of teachers that can be drawn from research and experience related to several often discussed reform proposals. In a number of cases, research is thin or nonexistent and we have turned to the opinions of researchers, including our own views, as the bases for speculation. Given the limits of both our knowledge and our experiences in the United States, are there lessons from other countries' approaches to teacher education from which Pennsylvania can learn?

We reviewed studies of and reports on teacher education in several other industrialized countries. With respect to preservice teacher education, we think that the lessons to be learned are limited. First, the characteristics of preservice teacher preparation are not dramatically different from country to country. Second, almost all of the reports we read asserted that teacher education was undervalued. Third, there is almost no empirical research that links different approaches to educating teachers to differences in teacher or student performance.

But there are some differences among countries that may be worth noting. First, the level of general education required to teach in elementary schools is often lower in some other countries than it is in the United States. One explanation for this may be that those admitted to college may, on the average, be better educated than teacher candidates in the United States. Which brings us to a second difference. One finds little concern in most other countries over the academic qualifications of those entering teaching. Such concerns seem greatest in countries where teachers have lower status and relatively lower pay than others with similar educational backgrounds. Third, there appears to be less regulation of teacher preparation programs by provincial or national governments in most other countries than in the United States. Fourth, teacher education curricula are more often research-based in the United States than is the case in most other countries.

As in the United States, beginning teachers in many other countries are often seen to be inadequately prepared to teach effectively. In some nations, however, this is viewed as a problem to be solved by schools. The most dramatic example of this disposition is Japan. In Japan, practice teaching, with some exceptions, is limited to a very short period. Beginning teachers, despite the fact that they are generally well-educated, are seen as novices who must undergo substantial training during their first year. A full-time mentor is assigned to every three teachers, on the average, and novice teachers spend almost half of their first year in structured learning opportunities. It is also worth noting that university involvement in the education of teachers in Japan is very limited compared to the United States.

While the formal elements of the way we do preservice teacher education in the United States are not dramatically different from the those in other industrialized countries we studied, many other countries seem to invest more in inservice education than we do in the United States. Japan again is the most notable example of a country where teachers have relatively rich lifelong opportunities to learn. These include workshops, conferences, residential programs at training centers, foreign travel, and, for some teachers, fully paid graduate study. Moreover, Japanese teachers (and Chinese teachers) teach fewer hours than American teachers and this "free time" is often spent in consultation with other teachers and in teacher-led study groups.

The greater commitment to the continuing professional development of teachers in Japan, China, and some other nations is apparently related to the importance attributed to good teaching, beliefs about teachers' needs and capacity to learn over time, and to the fact that in most countries, teachers seldom leave the profession for another. We think that the quality and quantity of continuing learning opportunities for teachers in some other nations should be attended to in the United States. Maybe students in these countries learn more because teachers learn more.

Improving the Education of Teachers in Pennsylvania

There are a number of things that can be done to improve the education of teachers in Pennsylvania. We seek here to draw attention to those strategies that we conclude are most promising and we do so by revisiting the three sets of proposals for improvement discussed earlier.

Improving the Academic Quality of Teacher Candidates

- The surest way to improve the quality of teacher candidates is to improve teacher salaries. However, as we have suggested in Part II above, across the board increases would be inefficient. The second best strategy is to ensure that teaching is professionally rewarding.

Improvements in selection processes and higher standards for entry to teacher education programs have eliminated the least qualified candidates, but they do not change the incentives for the "best and the brightest." Focusing further on these types of strategies is not likely to be productive.

A substantial impediment to attracting more academically able people to teaching, and an even greater impediment to innovation in teacher preparation programs, is that there seems to be little market for quality educational opportunities for teachers. First, most of those who hire teachers know little about and seem to care little about the difference in the quality of the higher education experiences of prospective teachers when they make their decisions to hire a new teacher. Second, because of the way career incentives (e.g., salary increases and promotions) are usually structured and because of the socialization teachers and administrators undergo in college and after, educators usually (and understandably) choose graduate study alternatives so as to minimize effort and financial cost rather than to maximize expertise.

The absence of a market for quality among the consumers of higher education's contributions to the education of teachers (e.g., those who hire teachers and teachers themselves) means that incentives within higher education to improve are low and important information that might drive improvement efforts is missing. The primarily extrinsic reasons for pursuing advanced "training" and the mediocre or trivial character of many so-called graduate education experiences, when coupled with the fact that the lessons learned often have little to do with the problems teachers confront in their classrooms, leads teachers and administrators to believe that there is not much to be learned from research and theory.

These comments about the absence of a market for quality are based on studies done in other states (cf. Murnane, et al., 1991). But we have no reason to believe that they do not apply to Pennsylvania. In our interviews, for example, several respondents noted that district superintendents have opposed certification proposals aimed at increasing teacher candidates' qualifications because these requirements would restrict their "flexibility" in assigning teachers to particular grades and courses. More telling perhaps is the fact that discussion (in our interviews and in published reports) of supply and demand for teachers in Pennsylvania is devoid of concern for the qualifications of personnel (cf. Senier, 1992). Furthermore, if Pennsylvania were to provide all students with opportunities to take advanced courses--such as calculus--more and better prepared teachers would be needed (Strauss, 1992).

First-Order Priorities for Improving Teacher Education Programs

Of the several strategies for improving teacher education we have discussed, those that appear most likely to yield teachers who (1) can learn to teach in ways that develop diverse students' motivation and capacity to engage in higher order learning, (2) are able to use their preservice education when they assume the responsibilities of a full-time teacher, and (3) are motivated and capable of engaging in productive professional learning that develops and uses new knowledge are:

1. inquiry-based professional course work aimed at developing teachers who are reflective practitioners and understand the basic principles of "content pedagogy,"
2. the creation of professional development schools to enhance the ability of prospective teachers to apply what they have learned about teaching and learning, and
3. the development of outcome-based evaluation of teacher education programs.

Developing an Inquiry-oriented Preprofessional Curriculum. How shall preservice teachers be taught? Howey and Zimpher (1989) describe preservice programs at six universities and, while they did not assess program effectiveness, they describe several elements that contribute to program coherence. Among those they describe are clear and commonly held conceptions of teaching and schooling; clear thematic linkages; working with student cohort groups; adequate curriculum materials and a well-designed laboratory component; articulation between on-campus and field-based experiences; and utilization of knowledge bases and systematic evaluation. While the inclusion of these components is desirable, it is also a distinct approach to curriculum, the nature and construction of knowledge, and learning to learn that also requires multiple opportunities for preservice teachers to engage in reflection with their peers, college instructors, and teachers in the field about rationales for their practices and belief systems, about how these influence choices and practices, and about how to engage in systematic inquiry in the context of teaching.

An inquiry approach would also include using tools for inquiry (e.g., teacher-initiated action research, peer observation, etc.) and examining the matches and mismatches among these elements and their own practices, and the relationships among teaching and learning. In short, we contend that while components and elements must be coherent within preparation programs, the process for teacher education must also be firmly grounded in inquiry across all elements. In other words, the task of the university should not be limited to the delivery of a product or a service, or even a prescribed body of knowledge that is expected to cover all that teachers must know and be able to do. Universities should also provide tools for analysis and problem-solving that can be used to engage problems and issues of practices that will evolve across time.

Establishing Professional Development Schools. Professional development schools should be created to enhance the ability of prospective teachers to apply what they have learned about teaching and learning within a context that supports reflection, experimentation, analysis and reconstruction. In our view, most school settings in which preservice teachers are educated not only fail to support this growth process, but are disconnected from, or are tangential to, the important program components described by

Howey and Zimpher (1989). We have discussed the potential pitfalls of field-based experiences earlier. Here, we want to emphasize the importance of the professional development school as a specially created school for bringing connectedness to the process of learning to teach and learning to learn to teach.

How is the PDS different from what we already have? For a long time, we have been asking the typical school to do what it was not mandated to do, educate teachers; a PDS would have teacher education as one of its missions. The PDS provides a common context for learning to teach and can serve to support new learning not only for the preservice teachers, but for the experienced teacher and college faculty as well. Because of the availability of support and teaching resources, time for planning, reflection, and discussion can be a regular part of the school day. Finally, by changing the school organization to support the learning that takes place there, a redefinition of the roles and responsibilities among all educators and students can occur as well.

Developing Outcome-based Program Approval and Certification. Earlier in Part IV, we discussed the interest in outcome-based program approval. Efforts by states to regulate the quality of teacher preparation programs and, thus, the quality of teachers tend to discourage innovation and to provide little quality control.

Approving programs and certifying teachers by the degree to which they demonstrate achievement of certain outcomes will focus attention on what we want teachers to know and be able to do. Two principles should be followed in implementing such a plan. First, the outcomes to be measured should reflect the fundamental changes in what we need teachers to know and be able to do--such as teach for understanding and be able to engage in collaborative problem-solving. Second, outcomes should be measured at different stages of a teacher's entry to the profession so that accountability fits the responsibility assigned to each type of institution. For example, teacher knowledge and competence could be measured after completion of each of the following learning experiences: college-based coursework and field experiences, professional development school, induction year, and the first three years. Of course, the standards should also apply to teachers who enter the profession through alternative routes.

The primary purpose of outcome-based assessment should be to promote effective professional development. Thus, programs and teachers should have the opportunity to remediate shortcomings, but the same standards can be used to deny program approval and certification.

In our more detailed discussion of preservice preparation later in Part V, we suggest the outcomes for which preservice preparation might be held accountable and some ways to assess these outcomes. The NCAST report on certification standards suggests another related set of outcomes to be expected of new teachers after three years of service.

Other Strategies for Improving Teacher Education

Those proposals just discussed have been receiving considerable attention by policy-makers or by educators, but we have by no means covered every interesting idea being proposed. Suggestions for improvement about which there appear to be little disagreement and which involve modest costs of implementation include:

1. Having students go through the teacher education curriculum in cohort groups. The University of Pennsylvania's START program, which involves a cohort approach to practice teaching, is an example of such an effort. Advocates say that cohorts should be formed as prospective teachers enter the teacher preparation programs, as is the case at the University of Massachusetts at Amherst and elsewhere.

2. Early contact between teacher education faculty and prospective teacher candidates so as to support student interest in teaching prior to their formal entry to the teacher preparation program.

3. Increased use of cases to develop prospective teachers' capacity for problem-solving and to help students link theory and research to issues which new teachers are likely to face (cf. Harrington & Garrison, 1992).

4. Incorporating in programs for educating school administrators lessons related to restructuring schools, evaluating performance, and providing feedback and counsel so as to facilitate teacher learning.

Conspicuously absent from the array of proposals for improving preservice teacher education programs are proposals to enhance the capacity of teacher educators to undertake the innovations that policy-makers believe will improve teacher preparation. Among states with comprehensive reform plans, only North Carolina has incorporated in its reform plans funding for the professional development of teacher educators, and this program is modest indeed. Requirements that teacher educators spend more time in schools is one way policy-makers have sought to improve the knowledge and performance of teacher educators but this strategy is mired in beliefs that (1) what goes on in schools now should be what prospective teachers learn to do, and (2) that observation of effective practice--assuming exemplary practices are accessible--in itself results in the capacity to teach others how to understand and engage in such practices.

The Pennsylvania Academy for the Profession of Teaching devoted most of its resources to enhancing the capacity of teacher educators to learn new approaches, to collaborate within and across institutions, and to develop partnerships with schools. While the Academy, which was terminated in June, 1993, was an agency of the State System of Higher Education--and thus did not work directly with all teacher educators--its mission and activities seem to us to provide useful lessons for building a statewide capacity for strengthening the education of teachers.

The National Science Foundation (NSF) is supporting several efforts at colleges and universities, including efforts in Pennsylvania, to develop models for improving the preparation of teachers to teach mathematics and science. However, there is no program at NSF to identify the most promising of these and to facilitate their use in teacher education nor does there appear to be any such effort in the state of Pennsylvania.

Induction

The single most important way to improve the education of teachers would be to develop more effective induction programs. These programs should serve as a source of advancing the professional knowledge, skills, and dispositions of novice teachers in ways that build upon exemplary teacher preparation programs that embody the focus on reflective teaching and content pedagogy and which provide rich practical experiences in the context of professional development schools.

One might wonder why focusing on induction as the highest priority is desirable, given the premise that induction experiences should build upon quality professional learning. There are two reasons we assign highest priority to induction. First, the absence of effective induction programs means that many of the effects of improvements made in teacher preparation programs will be wiped out in the first year or two of teaching. Second, the establishment of effective induction programs may have the consequence of enhancing the effectiveness of experienced teachers and changing the professional climate of schools.

The focus on effective induction raises the question, "What makes a program effective?" In our brief discussion of induction programs earlier in this section, we provided some part of the answer. And, in Part V of this Report, we outline the elements of a new approach to induction that we recommend the state of Pennsylvania consider.

Limits on Improving Teacher Preparation

If this set of proposals for improving teacher education were implemented, teachers would be more effective than they are now and schools would be more productive. Yet these proposals fail to address basic problems that undermine the possibility of developing a systemic approach to the education of teachers that will contribute significantly to the capability of schools to nurture higher order learning for all children. These policies and practices just discussed essentially seek to fix the present system and leave the goals and the relative roles of the different institutions involved more or less unchanged. Moreover, improvement strategies maintain basic assumptions about how, when and where teachers learn that now limit the effects of teacher education, both preservice and continuing education, on effective teaching.

We turn, then, to our proposals for substantial changes in the goals and roles played by various sources of teacher learning, what we have called a re-visioning of the way teachers are educated.

PART V

RE-VISIONING THE EDUCATION OF TEACHERS: REDESIGNING AND REALIGNING GOALS AND ROLES

In the previous Parts of this Report, we have argued that changing the education of teachers in ways that will significantly contribute to the capacity of schools to meet goals once reached by only a few will require fundamental changes in the goals and roles of the various institutions responsible for enhancing teachers' effectiveness.

The overall goals of this redesigned and realigned system for educating teachers follow from the discussions in previous sections. These goals are:

1. Help teachers give all their students the capacity and motivation to engage in higher order learning (i.e., to teach for understanding).
2. Develop and enhance teachers' motivation and ability to learn ways to facilitate learning and to choose among them.
3. Provide an interrelated set of learning opportunities reflecting the fact that teachers are better able, cognitively and motivationally, to learn different things at different stages of their professional development.
4. Ensure continuity in the modeling of the theories of learning and of the values we want teaching to reflect.
5. Realign the roles of the institutions involved to do what their capabilities and cultures best suit them to do in ways that complement rather than supplant or replicate the roles of other institutions.

To achieve these goals, Pennsylvania will have to go beyond reform to a new approach--one that involves a re-visioning of the education of teachers. The re-visioning plan we propose incorporates the best aspects of the most popular proposals now on the reform agenda, but transcends these improvements. Re-visioning involves the implementation of new concepts and a new array of institutional purposes and responsibilities that respond to new demands and challenges confronting public schools and argues for restructuring schools to enhance both teacher and student learning.

Realigning Goals and Roles

Rethinking the Basic Purpose of Preservice Preparation

The basic purpose of preservice teacher preparation should be changed from the development of teaching competence to the development of the capabilities and motivation to learn to teach. Such a change in purpose would be followed by appropriate changes in curriculum and in the ways the learning of prospective teachers is facilitated. For example, preservice preparation to teach, whether it be at the graduate or baccalaureate level, would be concerned with the development of analytical and problem-solving capabilities, prospective teachers would be taught how to learn and would develop an understanding of the numerous influences on learning, more emphasis would be placed on communication and collaborative behavior, and students would learn about the sources and obstacles to individual and organizational change.

Since re-visioning the education of teachers begins with the redesign of preservice college-based programs, it seems important to draw a more detailed picture of what this foundation for the education of teachers would entail. Before we turn to this task, however, we want to outline the overall plan for re-visioning the education of teachers.

Developing Teaching Competence

The primary responsibility for the development of teaching competence should be vested in schools rather than in colleges and universities. In order, however, to ensure continuity and the infusion of new knowledge relating to best practice, new institutional mechanisms for fostering the development of teaching competence would be needed to play the role that internships and residences play in the education of physicians.

The development of teaching competence would begin, of course, in colleges and universities but the functions now served by practice teaching would be shifted to "professional development schools" (PDS). Most professional development schools that now exist (see Part II of this report for a discussion of PDSs) are extensions of university-based programs and their teacher training function is the primary responsibility of the university. This arrangement could continue under our plan, but shifting primary responsibility to schools has two advantages. First, it represents a clear break from past practice. Thus, the probability of realigning functions that feed into and follow from the activities of Professional Development Schools will be enhanced. Second, it creates a distinct stage in the professional development of teachers and entry to and exit from this stage could be made much more rigorous than is entry to and exit from practice teaching.

When one begins to imagine what a system for educating teachers would look like, it becomes clear that not every college and university and not every school district would operate a PDS. One reason for this is that the cost would be excessive. Another reason is that not all universities and colleges and not all school systems have the capacity to undertake this role. In Appendix A, we elaborate on the structure and functions of the type of PDS we would recommend.

The development of teaching competence, like the development of teachers' professional knowledge generally and their knowledge of the subjects they teach, is a career-long activity. In particular, concern for teaching proficiency should continue to be a high priority during the first year or two of professional practice, as we indicate below.

Helping Teachers Utilize Their Liberal Arts and Disciplinary Knowledge

Teacher educators should be bridges between liberal arts and disciplinary education on the one hand and the practice, science, and art of teaching on the other. What would such bridging look like? Consider, for example, that some of the most significant problems new teachers confront relate to classroom and instructional management. The actions teachers take in resolving these problems involve some of the most fundamental puzzlements and dilemmas of democratic societies. It is doubtful, though, that more than a handful of teachers have ever reflected on Rousseau's ideas about social contracts or Coser's ideas about the functions of social conflict when they make decisions about the maintenance of order in their classes. Similarly, it seems unlikely that many teachers recognize that in making decisions about grouping for instruction they are dealing with issues that have been at the heart of debates between utilitarian and libertarian philosophers for centuries. If such connections are to be made by teachers, like connections between content and pedagogy (see discussion of "content pedagogy" in Part II), teacher educators will have to be the bridges.

Research on learning suggests that the transfer of knowledge from one domain to another--or from one type of problem to another--is very difficult. Without specific illustrations and practice in making such transfer, much of what we learn remains "inert" and unused. It is fanciful to believe that professors who teach general education or disciplinary courses will help prospective teachers see the relevance of the lessons they teach to instructional content and practice. Thus, if we think that teachers should use key ideas and content learned throughout their college years, the transfer will have to be facilitated by teacher education.

Steps--small ones--have been taken in Pennsylvania to bridge the gap (chasm) between liberal arts and pedagogical courses. For example, Millersville State University is participating in Project 30, a national consortium promoting linkages between disciplinary and pedagogical courses. The Pennsylvania Academy for the Profession of Teaching has facilitated discussions of teaching with teachers in state system universities. These efforts, however, focus on subject matter instruction, not on how central lessons from the core liberal arts curriculum can be applied to teaching.

Induction

Systems of induction for beginning teachers should be strengthened and staffed by school personnel who have ties to universities. As we indicated in Part II, programs for facilitating the entry of new teachers to the profession are increasingly common. However, most such programs, including Pennsylvania's, are underfunded, understaffed, and focus on helping teachers "learn the ropes" rather than on enhancing their professional knowledge and expertise. Moreover, while university involvement in induction is sometimes provided for, it is sometimes tenuous and the induction process typically is disconnected from both preservice and day to day experiences of beginning teachers.

The first year of teaching is filled with opportunities for teacher learning and teacher motivation to learn is high. To take advantage of this reality and to strengthen both new teachers' and mentor teachers' commitments to teaching for understanding and to lifelong professional learning, a new approach to induction is needed. Such a program has been developed in Tennessee. This "Professional Mentoring Program" was designed collaboratively by the three research universities in the state, the national and state teachers' organization, and the State Board of Education. This plan, though dropped from the Governor's reform plan because of funding shortfalls, provided for university support of beginning teachers through mentor teachers. That is, the university helps mentors support beginning teachers. School systems would have been funded to provide mentor teachers with release time, or salary supplements, or to add staff. Higher education's contributions, which include professional seminars for mentors and telecommunication networking for mentors and novice teachers, would have been funded by state-subsidized tuition. The outlines of this plan (which was co-authored by the authors of this Report) are provided in Appendix B.

The development of the mentoring approach advocated here not only serves beginning teachers, it can be a source of professional development for experienced teachers. Mentors facilitate the learning of novices and the university support of mentors takes the form of inquiry-based education we discussed earlier. Because mentors are involved in modelling and explaining how to teach for understanding, their understanding of and commitment to this way of facilitating student learning is also deepened. In effect, the beginning teachers they support put them on stage in a new role which requires that they take a new look at their teaching practice (Wade, 1993). However, the new strategies for teaching being learned and practices by mentors and novices do not, typically, get diffused through the school (Wade, 1993). That is why schools must be restructured for teacher learning; that is, schools should be "learning organizations." We return to this point later.

It is important to recognize that virtually all Professional Development Schools (PDSs) do not address the "induction problem." PDSs do not exist in most school systems and, even where they do exist, union and teacher association agreements usually require that beginning teachers must be assigned to schools from which more experienced teachers have moved rather than to a PDS.

Enhancing Professional Development in Schools and School Systems

There is growing consensus that fundamental reforms will not happen unless substantially greater and more effective opportunities for professional development are available to educators. This growing agreement is reflected in the academic literature (see, for example, Lieberman, 1992) and more importantly in the analyses and recommendations related to reauthorizing the Elementary and Secondary Education Act (ESEA) (cf. Hawley, 1992), the General Accounting Office's definition of systemwide school reform (GAO, 1993), and reports from policy maker groups like the Education Commission of the States (1993).

There are obvious implications of this development for inservice teacher education. But, if teachers are to have more opportunities to learn and what they learn is to be an important source of education improvement, preservice preparation must prepare teachers to be problem-solvers, to value learning, and to apply what they learn in the interests of all children.

The responsibility for staff development on the part of school systems should be increased and the capacity of schools and school systems to assume this responsibility successfully should be strengthened. This, in turn, would require that universities develop the capacity--and the will--to contribute to teacher learning in terms of teachers' needs rather than professors' judgments about what teachers should know. Moreover, such a change would move universities to develop new ways of facilitating teacher learning, including the extensive use of telecommunications.

As is the case in many other states, staff development for teachers in most districts is of two types: (1) five or six days of inservice training which is often not targeted on problems teachers confront, but rather by school or district priorities, and (2) courses or workshops taken at universities or Intermediate Units. Too often these experiences cover a potpourri of topics and are disconnected in time and context from the problems teachers need to solve to more effectively enhance the learning of all of their students. Indeed many "learning experiences" teachers have prepare them for tasks they will never have the opportunity to perform. In other words, the more integral teacher learning is to the process of teaching the more effective it is likely to be. It is probable that further investments in the most common approaches to staff development used in Pennsylvania would be unproductive.

Continuing University-based Opportunities for Learning

Teachers should be provided with opportunities to return to universities for short periods of time for additional formal education that is primarily focused on theory and research and is not limited to pedagogical studies. It seems important that these courses or experiences earn the participants advanced degrees. Such courses should, however, be part of a plan for professional development that individual teachers work out in consultation with colleagues and supervisors.

Restructuring Schools as Learning Organizations

If the capability of schools to achieve never-before-attained learning goals for an increasingly diverse population of students depends on fundamental changes in the ways students are taught, then the ways schools are organized must change (cf. Murphy, 1991). The implications of this rather simple proposition, however, go well beyond the most popular calls for "school restructuring" to the development of schools as "learning organizations."

Despite the fact that substantial opportunities and resources for teacher learning have seldom been incorporated into school reform policies, the idea that teacher learning is an essential and continuingly important element of school change is not new. For example, based on their widely cited review of research on school effectiveness, Purkey and Smith (1983) concluded, "School improvement can be helpfully conceptualized as a process of staff development directed toward implementing ... [policies and practices] associated with school effectiveness"(p. 63). More recently, Lieberman (1992) observed, "A growing body of research into new practices is helping us to develop collaborative, inquiring workplace environments for teachers at the same time that they are being developed for students" (p. 8).

(Also, see Brause & Mayher 1991; Cochran-Smith & Lytle, 1992; Elliott, 1991; Fullan, 1991; Pallas, Natriello & Reihl, 1992; Schecter & Ramirez, 1992; Shedd & Bachrach, 1991).

The "schools as learning organizations" idea is different from many other proposals for school improvement that emphasize teacher learning in at least two ways: (1) the emphasis is on defining the need for teacher learning by on-going school-wide (or broader) assessments of student achievement and (2) the substantial enrichment of the learning resources, including the availability of personalized telecommunication, is anticipated.

If one were to visit schools that are learning organizations, one would see information-rich workplaces that use the gap between goals for students and student performance to improve the organization's efficiency and effectiveness through redesign, collective action and/or efforts to increase professional or technical competence and capability. Most professional development would be built into the work process and be integral to or lead directly to evaluated action. One would see structures and processes that (a) provide rich and accessible information, (b) facilitate collaborative problem-solving, and (c) develop and sustain an organizational culture that encourages cooperative modes of work and continuous openness to change.

In the learning organization, teachers would have substantial opportunities to influence school-level policies and practices and to learn and work with other teachers. Influence on school decisions would derive from expertise and initiative rather than formal authority. More specifically, in schools that are learning organizations, teachers (and administrators) would:

1. have time to reflect with other teachers and with support personnel about student achievement and to learn and experiment with new approaches to facilitate student learning,

2. work with other teachers in setting goals, providing feedback, and exploring new directions,

3. have access to school libraries with professional journals, audio and video tapes and other learning resources,

4. use computer networking to learn from data bases, expert advice, research findings and exemplary practices that are relevant to better addressing students' learning needs,

5. be able to identify educators in other schools and university personnel who have specified expertise and to interact in two-way television with these experts and to observe effective practices about which teachers want to know more,

6. have the opportunity to develop specific talents which they would share with other educators, with persons learning to teach, and with university personnel,

7. be able to invite university personnel to observe and assist in the school or to conduct seminars,

8. have access to national experts, workshops, and courses through two-way networks of telecommunication,

9. be supported by central office personnel who would be on call and have expertise in particular topics or subjects (these personnel, and teachers with specializations, would be supported by university personnel, regional educational laboratories, and other sources of teacher learning).

This list of the learning opportunities that would be available in schools that valued and supported teacher learning is not exhaustive. The learning organization school has yet to be invented and its characteristics and resources should be defined by teachers, with the help of other educators.

Educating School Administrators

The idea of schools as learning organizations, as well as our earlier emphasis on the importance of teacher recruitment and induction, should draw attention to the important role school administrators play in supporting effective teaching. While ways to improve the education of school administrators are beyond the scope of this report, it seems essential to recognize that improvements in teaching that might be achieved by significant improvements in the education of teachers are dependent on commensurate changes in the preparation and continuing education of administrators (Murphy, 1990).

Propositions for Guiding the Restructuring of a Professionally-Oriented Preservice Curriculum for Learning to Learn to Teach

Several propositions to guide the restructuring of a professionally oriented curriculum for learning to learn to teach are set out below. These propositions embody a goal and a general process, and they are followed by a brief justification for the importance of achieving the goal. Examples are provided for the types of processes or content that the component would embody to suggest how the attainment of the goal might be assessed. We devote a considerable amount of attention to elaborating the functions of preservice preparation to suggest how much prospective teachers need to know that they are unlikely to learn very effectively on the job. Moreover, we identify how teacher education might be held accountable for these important outcomes.

Proposition I:

> **Prospective teachers should understand differences in theories of learning, and have the ability and motivation to learn from relatively unstructured learning opportunities, from research, and from conditions they create in order to determine "what works."**

Rationale

- Instructional strategies should be rooted in theories of learning.
- Teachers say they learn most of what they know about teaching from experience.
- Learning new and sophisticated things from experience is problematic.
- Knowledge about effective teaching is changing rapidly and will continue to do so.

- Much of the information available to teachers now is underutilized.
- The information teachers have about student needs and alternative ways to meet these needs will be much greater in the future than it is now.
- The more one understands one's own learning, the better one is able to teach others.

Illustrative Processes

Courses taken for teacher preparation should deal with research on cognition. Teachers should have opportunities to engage in exercises that require the identification of, reflection upon and application of alternative learning strategies, including those that would affect students in heterogeneous and "diverse" instructional settings. There should be coursework in systematic analysis, qualitative research, and the uses and misuses of research and tests of various kinds.

Possible Outcome Measures

- Tests of ability to solve complex problems posed by simulations.
- Tests of ability to diagnose and prescribe solutions to hypothetical student learning needs.
- Tests of ability to describe (in theory and practice) one's own learning strategies in the face of simulated learning opportunities.

Proposition II:

Prospective teachers should have the ability to communicate orally and in writing with considerable clarity.

Rationale

- A teacher's ability to communicate clearly appears to be directly related to her ability to facilitate student learning.
- Teachers' communication skills are modeled by their students.
- Communicative ability influences one's ability to help one's peers and to interact with parents.
- Teachers with weak communication skills reinforce the stereotype that teachers are academically and intellectually inferior to other professionals.

Illustrative Processes

Numerous experiences throughout the college curriculum to write and make presentations that are carefully evaluated.

Possible Outcome Measures

- Ability to evaluate examples of written and verbal communication in ways that manifest understanding of principles and techniques.
- Ability to prepare brief reports, letters to parents and other tasks requiring writing skills.
- Ability to respond orally to questions in ways that are coherent.

Proposition III:

Prospective teachers should be able to use what they learn in their "liberal arts" courses to enrich the content of what they teach and learn to make choices among strategies for facilitating student learning.

Rationale

Research on the transfer of knowledge from one field to another, as well as observations of teachers, suggest that it is unlikely that teachers will apply much of what they learn in their liberal arts courses, either with respect to substance or modes of analysis. Thus, explicit linkages need to be made that typically do not exist in most programs for preparing teachers.

Illustrative Processes

Teacher educators would take the responsibility for explicitly linking the theory and content of liberal arts courses to the professional curriculum. For example, in courses dealing with grouping strategies for instruction, the relevance of the conflict between norms of equity and norms of equality (a central issue confronting democratic nations) would be discussed and the consequences of alternative choices would be explored.

Possible Outcome Measures

Basic concepts and modes of analysis that are typically taught in liberal arts courses that are particularly relevant to teaching could be identified and prospective teachers could be asked to show how they would use these to address typical problems teachers must solve.

Proposition IV:

Prospective teachers should know the subjects they will teach--both content and content pedagogy.

Rationale

One cannot teach others what one does not understand. Few would quarrel with this generalization. The specific implications of this proposition, however, are unclear because little is known about how well and how one must know one's topic to be effective. The issue is particularly important for teachers who teach many subjects, such as elementary teachers.

Illustrative Processes

- Coursework involving in-depth study of subjects to be taught.
- Coursework that covers the enduring puzzlements in the field, relationships to related subject matter, and the epistemology of the subject.

Possible Outcome Measures

- Tests of subject matter knowledge, rather than grades and number of courses. Such tests would include the changing facts, concepts, principles and laws related to the subject.
- Assessments of the ability to explain the content pedagogy of the subject, preferably in the context of an interactive simulation or oral interview.

Proposition V:

Prospective teachers should understand and be able to apply basic principles of human development.

Rationale

This knowledge is not likely to be learned on the job in a reliable and up-to-date way. Prospective teachers need to understand the relationship between cognitive and emotional development and how these might differ by the age and background of the child. There are many myths parading as fact in all organizations, including schools. It is important for prospective teachers to know how to separate myth and reality, especially with respect to assertions about racial, ethnic, and gender differences.

Illustrative Processes

Coursework which engages the appropriate research and which provides students with many opportunities to apply basic principles to complex situations relating to instruction and inappropriate student behavior. The curriculum would include specific attention to differences and similarities among students from different racial, ethnic and socioeconomic backgrounds with attention to the temptation to stereotype pupils and the consequences of such stereotyping.

Possible Outcome Measures

Prospective teachers would be expected to know the relevant knowledge and be held accountable for it in test situations. The ability to apply this knowledge to the solution of typical problems new teachers confront could be assessed through simulations and/or responses to written cases.

Proposition VI:

Prospective teachers should learn the elements of effective collaborative and cooperative behavior among both teachers and students.

Rationale

While one might argue that this can be learned on-the-job, cooperation among peers may be an unnatural act, at least in a culture that emphasizes individual achievement and competition. The co-called second wave of reform is calling for the restructuring of schools, but the success of these efforts depends on how comfortable and knowledgeable teachers are about the relevant behaviors.

Illustrative Processes

The curriculum would embody knowledge about small group behavior and the processes involved in giving and receiving feedback on teaching practices. Most important, learning processes should provide opportunities to collaborate and for collaborative behavior to be evaluated. Moreover, students should see faculty engaged in such interactions. Prospective teachers should understand why schools are organized, informally and formally, as they are and the effects of different structures on teacher behavior. Special attention should be given to interactions among persons of different races, ethnic backgrounds, and gender.

Possible Outcome Measures

Performance on exercises dealing with the provision of feedback, the evaluation of interpersonal actions, and the analysis of obstacles to collaborative behavior can be assessed.

Proposition VII:

Prospective teachers should understand and be able to apply the basics of classroom and instructional management, including the philosophical issues surrounding the tasks involved.

Rationale

The difficulties of teaching that lead most to the lowering of new teachers' expectations for themselves and for their students appear to be the difficulty of managing instruction and maintaining discipline while remaining true to their hopes of being creative, flexible, and caring teachers.

Illustrative Processes

A well-designed introduction to classroom management that is revisited and extended in courses in subject matter teaching and field experiences. These concepts should be introduced and expanded as the preservice teacher becomes aware of classroom complexities and emerging problems that the teacher must solve. Preservice teachers should be able to understand classroom management as the task of creating a learning environment from the beginning by proactive planning, clear communication of expectations, and positive motivation that establishes and maintains an environment for learning, rather than as maintaining order and crisis management that focuses on intervening once problems have escalated. Effective classroom management requires careful analysis of students' needs for information, strategies for pre-planning in order to implement classroom tasks, and engaging students interactively in lessons designed to promote higher-order thinking and problem-solving. Interactive video-based simulations can contribute to analysis, discussion, and problem-solving before preservice teachers enter classrooms.

Possible Outcome Measures

Responses to simulations where the student is requested to explain rationales for the choices made, use of a variety of alternative strategies, understanding of concepts such as "monitoring" and "feedback."

Proposition VIII:

Prospective teachers should know the rudiments of teaching methods that are applicable to particular subjects and the related learning theory.

Rationale

While prospective teachers usually are impatient with theories of instruction, they are not likely to learn such theories on the job, much less be taught how these relate to knowledge about learning.

The central problem in implementing this proposition is knowing how much technique prospective teachers can reasonably be expected to use when they begin to teach. It seems unlikely that they will use sophisticated strategies without understanding the theories behind them since the application depends on the context.

Special attention should be given to alternatives to dysfunctional strategies they are likely to encounter (e.g., tracking, retention, corporal punishment, etc.).

Illustrative Processes

The content and learning opportunities embodied in the teacher preparation program should mirror subject matter teaching strategies. Prospective teachers should have the opportunity to model good teaching practices and should be able to evaluate the teaching of others. Strategies for teaching students of different races, ethnicities, social class, and achievement levels in heterogeneous settings should be emphasized.

Possible Outcome Measures

Evaluation of prospective teachers' responses to the task of teaching the subject(s) for which they are being certified to teach. Such evaluation might take place in the context of a simulation or in practice teaching involving "diverse" students. It would be carried out in Professional Development Schools collaboratively by college professors and especially trained clinical faculty who were themselves classroom teachers.

Redesigning the Certification Process

The specificity of expertise and courses that are required for certification clearly affects the supply of teacher candidates (Murnane, et al., 1991) Pennsylvania seems to be bucking a national trend toward teacher candidates having greater depth of knowledge in the subjects to be taught (AACTE, 1991). While the consequences of this may be positive for supply, it may not be positive for children being taught. This possibility, however, while it would probably be judged to be substantial by most experts on teacher education, has not been studied adequately. Pennsylvania is an excellent site in which to conduct such research given the variation in the preservice preparation teachers have, especially teachers in middle schools.

The certification and licensure of teachers should be a multi-stage process, probably having three steps. "Novice" certification would occur as teachers finish the Professional Development School and assume their first full-time positions. "Preliminary" or stage-two certification would occur after successful completion of the induction experience. Usually this will involve one year but it may, based on recommendations of the mentoring team, take two years with professional development that addresses identified weaknesses. "Full" certification would be granted after 3-4 years of experience. At each stage of the certification process, assessments should be based primarily on how well teachers engage in authentic instructional and collaborative tasks.

First Steps in Re-visioning the Education of Teachers: Shared Goals and Visions for Learning and Teaching

For at least the last 50 years, teacher education has been under attack and the response to these pressures has been incremental improvement. This has resulted in better teacher preparation than ever before and constant criticisms of preservice teacher education and complaints about the inadequacy, if not the wastefulness of the nation's investment in the professional development of teachers.

In Part III, we outlined fundamental problems that must be resolved if the education of teachers is to become systemic and to contribute significantly to the creation of schools that enable all children to engage in higher order learning. These challenges do seem monumental at first consideration. Perhaps the greatest difficulty of breaking away from the historic pattern of incremental change is the seeming impossibility of changing everything at once. Bringing about systemic reform requires a common vision and trust among the stakeholders in the system to be built that others will do their share of the new work and do it well. The fragmented character of our policy-making and our educational institutions and the accusatory rhetoric of reform over the last decade make common vision and trust difficult to attain. There are signs of a readiness to break away from limited and limiting approaches to the education of teachers in Pennsylvania.

Yet another indication of readiness to chart a new course in Pennsylvania can be found in a report of the Pennsylvania State Education Association (PSEA) entitled Teacher Education: The Critical Difference. The PSEA recommended 15 departures from "current practice," 10 of which deal with the characteristics of a comprehensive strategy for educating teachers (PSEA, 1992b). Those ten recommendations (the others focus on certification) were:

1. Teacher preparation must incorporate the new collegial leadership roles recommended for teachers.
2. Teachers must learn how to teach at the same time they are taught what to teach.
3. Preparation programs should address educator responsibility to create the conditions of success for a wide range of student capacities.
4. The curriculum offered in teacher preparation programs must be revamped according to educational research and the wisdom of practice.
5. Colleges and universities must work more collaboratively with practicing teachers to ensure a preparation program that is relevant to conditions in basic education classrooms.
6. Teachers of teachers should model best practice in all teacher preparation courses.
7. Practicing teachers must be used in planning and conducting induction programs.
8. Professional development must be more fully integrated into the work life of teaching.
9. Administrators should be prepared to facilitate the work of professional teachers.
10. Certification for all professionals should include mechanisms for assuring fitness for permanent certification.

The re-visioning of the education of teachers which we have outlined earlier in this part of the Report is consistent with the principles embodied in the PSEA's proposals. And, as we have suggested, several pieces of the system we have recommended, as well as the philosophical assumptions underlying this system, can be found in schools of education and school systems in Pennsylvania. Had we looked deeper and further than we did, no doubt we would have found more evidence that the idea of re-visioning has roots in the state.

If Pennsylvanians who would change the education of teachers would rest the oars that have been pulling against one another, the winds of significant change could take the state in new directions. In Part I, we identified developments in the economy, in the diversity of the people of America and of Pennsylvania, and in our understanding of how children learn. Recognition of these realities appears to be increasing throughout the nation and the state and this awareness could permit agreement that the job we are asking schools and teachers to do has never been done before. Thus, there is no blame to be assigned; new goals require new roles for those involved in the education of teachers.

While well meaning, the current agenda for improving teacher education in Pennsylvania and other states is based on inadequate assumptions about learning and institutional change. It ignores the needs that are served by current beliefs and practices. Moreover, because it is bounded by the paradigm that has constrained the effectiveness of teacher education all along, few really believe that the reforms being most widely discussed will make much difference.

There are adequate grounds to conclude that Pennsylvania, like other states, cannot get there from here--even if the road is straightened, the map is made clearer, and the vehicle gets a tuneup and a paint job. It is time to re-vision the ways teachers are educated using designs for basic change founded on an understanding of how teachers learn and of the incentive structures, capabilities, and motivations of different sources of teacher learning.

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APPENDIX A

WHAT THE TEACHER PREPARATION INTERNSHIP IN PENNSYLVANIA MIGHT LOOK LIKE

The following scenario seeks to provide a picture, through the fictional experiences of an intern, of what the internship phase of teacher preparation might look like if Pennsylvania were to establish the internship as an essential component of preservice teacher education. The scenario presented here imagines that the internship takes place in a Professional Development School but the characteristics of the experience would be similar in other types of internships.

Carol Brown graduated from State University where she majored in an inter-disciplinary field called child development and took a core of professional education courses. She passed a state examination for prospective elementary teachers and was certified by the university as being ready to undertake a year-long teaching internship which will ultimately lead to the receipt of her teacher license.

Carol applied for an internship in a Professional Development School (PDS) in the Gotham School District. The PDS to which she sought admission serves a diverse population of students in grades K-5. There are three classes for each grade level in the school, but only two classes in each grade had interns. Carol was one of 36 interns chosen from among some 95 applicants. She was selected, like her peers, by a panel of two teachers from the school and two university faculty members from Polk University. (Polk University and the Gotham School District are collaborating on offering the internship, having been awarded state funds to do so on the basis of a proposal submitted to the State Department of Education.) Carol was selected on the basis of her academic performance, her test scores, her evaluations by practicum supervisors, and the way she conducted herself during the interview she had with the panel.[1]

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[1] *Carol learned that teachers who taught in the PDS were selected from among many applicants on the basis of their past performance as teachers, recommendations from previous associates, and their interest in teacher education. The appointments were made by the school's principal from among candidates recommended by a personnel committee comprised of some of the PDS teachers and university faculty who teach and supervise interns.*

Teachers who work in the PDS participate in graduate study, tuition-free. PDS teachers have adjunct faculty status at the university and can use resources and facilities offered by the university. Funds are assigned to the school by the district for those activities that serve the district as a whole (e.g., research and staff development). The intern coordinator and the university professors who participated in the program were paid their regular salaries. All teachers assigned to the PDS participate in a seminar to prepare them for their role as teacher educators.

Carol learned that most teachers in the PDS, but not the lead teacher or the intern coordinator, rotated into other schools in the district every three or four years. Teachers newly assigned to the PDS did not assume responsibilities for interns during their first year which is why only two of the three classes at each grade level had interns.

The PDS in which Carol served her internship is administered by a principal and faculty who were selected because they had demonstrated superior performance in their previous positions and were especially interested in teacher education.

In most ways, the PDS looks like other schools in the district with respect to class size, curriculum, daily schedule, special events, support staff, extra curricula activities and facilities. But, in addition to the 18 classroom teachers in the school, the school is staffed by a lead teacher, an intern coordinator (who is a classroom teacher), and a full-time university faculty member. Other Polk University faculty also work in the school providing instruction and supervision to the interns related to their special expertise.

The teacher education function of the school is co-directed by the lead teacher, and the university professor assigned to the school. Administratively, these individuals report to the principal. The policies and practices employed in the training of interns are established by a committee of teachers and university faculty in accordance with a plan submitted to the State Department of Education. This plan conforms to general guidelines set by the state that apply to all internship sites.

Carol is one of three interns assigned to a third grade class in the PDS (the other interns graduated from other colleges in Pennsylvania). During the first three months of the school year, Carol participated in seminars taught by university faculty, the lead teacher and the intern coordinator (these individuals also taught at Polk University on a limited basis during this period).

The seminars she took focused on such topics as specific teaching strategies, classroom management, ways of understanding the dynamics of school environments, relations with parents, grouping of students, the development of lesson plans, student evaluation, and other topics essential to effective teaching that built upon what she had learned in college. Most of these seminars were linked directly to opportunities to observe and discuss how the exemplary teachers working in her PDS, as well as teachers in other schools, performed these tasks. She had the opportunity to engage in micro-teaching and simulations of these elements of teaching and to discuss what she had learned and observed with the other interns in her school.

During this initial period, Carol and the other interns assigned to "her" third grade class met with the teacher of that class, who was called a "mentor teacher," on a regular basis during the school day when the teacher's class was being taught by university faculty, the lead teacher or the intern coordinator. The mentor teachers did not receive extra pay for this role, but later in the school year, did have a significant amount of "release time" during which they took courses, undertook research, and participated in projects relating to curriculum and staff development.

Throughout the first three month period, Carol's performance was systematically evaluated and a decision was made by her internship team--the university professor assigned to the PDS (as his primary assignment), the intern coordinator (some intern teams included the lead teacher rather than the intern coordinator) and her mentor teacher--that she was ready to move on to the next phase of her internship. Most of the 36 interns in the school also received "passing marks" but three interns were asked to undertake additional study in specific topics that their team felt they had not learned.

The second three months of the internship were very much like the traditional practice teaching experience in which most students in teacher preparation programs had participated before Pennsylvania changed its procedures for educating teachers. However, unlike most of those earlier practice teachers, Carol's "practice" teaching was:

- linked closely to the lessons she learned in Phase I of the internship (which in turn had been linked to her college learning).
- supervised more intensely--her mentor teacher and university faculty with expertise on the subject about which she was seeking to demonstrate her capability observed her on a daily basis.
- observed by other interns (some of these sessions were videotaped) with whom she later in the day discussed her performance.
- took place in more than one classroom.
- was coupled with an on-going seminar taught jointly by the university professor based at the school and the lead teacher or intern coordinator (the seminar met in two small groups organized by grade level being taught).

During this second phase of the internship, Carol's mentor teacher maintained primary responsibility for the class. She observed most of the classes Carol taught but also left the classroom from time to time. During these periods, Carol was observed by the other members of her mentor team, or by other mentor teachers, or by other university faculty who came into the PDS to follow up on the lessons they had taught during the first three month period. Throughout this introduction to teaching, Carol received continual feedback and once every two weeks she met with her intern team, which more formally assessed her performance and discussed this assessment with her. Carol assumed increasing responsibility for the classes she taught throughout the second period. The responsibility for teaching given to fellow interns varied depending on their intern team's assessment of their progress. Interns who were having particular difficulty spent extra hours with the mentor coordinator and the university professor assigned to the PDS in order to correct their deficiencies.

At the end of the sixth month of the internship, Carol was evaluated once again and her intern team decided that she was ready to assume responsibility for her "own" classroom. Five of the six third grade interns were given teaching assignments, three in the PDS and two in another school in Gotham district. The two interns not assigned to the PDS went to schools where the principal had agreed to cooperate with the PDS. The teachers in the cooperating school whose classes were being taught by the interns observed and counseled with the interns during the first week of the intern's assignments. The "out-school" interns continued to be supervised and assisted by their intern team, as were interns who stayed in the PDS.

During the last three months of her internship, Carol had all of the responsibilities of a first year teacher. Her teaching was observed from time to time by members of the intern team. At least once a week she met formally with one or more members of the intern team during which time she sought advice and team members provided feedback on her performance.

During the three month period that the interns had primary responsibility for classes, teachers in the PDS and the cooperating schools, in addition to serving as participants in the intern team, undertook various activities including curriculum review, staff development programs in other schools, university teaching, and research. The PDS teachers also participated in graduate seminars at Polk university (for which they paid no tuition and received credit toward a graduate degree). In effect, then, the PDS teachers had opportunities for professional development and also served as a system-wide resource. Some provided staff development services to neighboring school systems. The PDS teachers who were not mentor teachers spent the first month of the three month period in a graduate level seminar that focused on effective teacher education, the college curriculum for teacher education and skills of supervision so that they could rotate into the role of mentor teacher.

At the conclusion of the nine month period, Carol's intern team met to decide whether her performance warranted her being recommended by the principal for an apprentice certificate. The recommendation by the intern team, which was very favorable, resulted in her receiving her initial teacher certification from the State of Pennsylvania.

Of the 36 interns in her PDS, three were hired as apprentice teachers by the Gotham School District. Carol and most of the other interns sought teaching positions in other Pennsylvania schools. Two of the interns were not approved for certification but were allowed to apply for another internship the following year. Districts interested in hiring Carol had the opportunity to review her records and discuss her strengths and weaknesses with the intern team. Carol was hired by Rural District, her first choice. Her starting salary was $18,500.

Carol received stipend during her internship year of $10,000, which was comprised of a forgivable loan of $6,000 for the period that she participated in the internship and a $4,000 grant, in recognition of her services as a teacher. Her loan will be forgiven after she teaches for two years in Pennsylvania.

Carol married a fellow intern and lived happily ever after.

APPENDIX B

A PROPOSED EXPERIMENTAL PROGRAM FOR SUPPORTING THE PROFESSIONAL DEVELOPMENT OF BEGINNING TEACHERS AND THEIR MENTORS

The proposed program will include the Tennessee State Board of Education, the National Education Association, the Tennessee Education Association, and three universities -- Memphis State University, the University of Tennessee at Knoxville, and Vanderbilt University -- in an effort to design and implement innovative ways to help beginning teachers and mentor teachers who are designated to assist them. The program will be based on the principle that the fundamental purpose of reforming education is to enhance the learning of children and will involve a restructured relationship between schools and universities.

Program Goals

The proposed program seeks to achieve several goals:

1. to increase the effectiveness and reduce the unwanted attrition of beginning teachers by providing them with high quality mentoring that builds upon their preservice preparation;
2. to provide mentors with support from universities in ways that enhance the mentors' contributions to the professional development of new teachers as well as the opportunities for mentors to increase their own expertise and leadership capabilities;
3. to stimulate and facilitate new approaches to productive collaboration between

school systems and universities, which might include the establishment of Professional Development Schools;

4. to contribute to the professionalization of teaching by allowing mentors, university faculty, and beginning teachers to develop and demonstrate the values, roles and behaviors that should characterize teaching and schools in the years to come.

How the Program Would Work

Once funding is attained, (1) mentors will be trained for their roles in a week-long training program; (2) an electronic network will be established to link mentors to one another, beginning teachers to one another, and mentors and beginning teachers to university faculty; (3) a credit-bearing seminar for mentors focusing on issues relating to the professionalization and improvement of teaching, will be conducted. The content of the seminar will be determined collaboratively and might include--in addition to issues related to how best to support new teachers--topics related to school restructuring, helping behaviors, new research related to teaching and learning, and the professionalization of teaching.

Mentors will be chosen by school systems. All mentors in a given system would not need to participate. Teachers participating in the program could participate for more than one year, though one virtue of this program will be that it would build, over time, a cadre of teachers whose insights concerning support for professional development and the professionalization of teaching would be put to the service of all of their colleagues.

The beginning teachers supported by this program could be graduates of traditional certification programs, interns in post-baccalaureate certification programs, novice teachers in alternative licensure programs or experienced teachers returning to teaching after extended absences from the classroom.

The program will require collaboration among the universities, and those institutions involved would be expected to support the professional development and interaction of the faculty members who will participate.

The program will help universities to identify teachers who can play roles, as adjunct or affiliated faculty, in the universities' instructional and research programs.

The program will be supported by the Center for Innovation of the National Education Association (NEA) in collaboration with the Tennessee Education Association (TEA). Support from NEA will include modest start-up funding for program design and faculty stipends, access to the NEA/IBM electronic network, and participation in the NEA Teacher Education Initiative. Collaboration with the TEA will encompass program design, learning opportunities for participating mentors and university faculty in TEA-sponsored professional development activities, and formative evaluation of the program.

To encourage on-going improvement of the program and the dissemination of information about the program, the State Board of Education will appoint an Advisory Committee to work with the program. This committee will include, among others, representatives of the TEA and the Tennessee Association of Colleges for Teacher Education (TACTE).

Evaluation

In addition to on-going formative evaluation by participants, the program will be evaluated by a team from outside the state whose membership will be determined by the state in consultation with the TEA, and the TACTE. This evaluation will begin in year one of the program's operation, with a preliminary report due in year three and a final report in year five.

How Does This Program Differ from Other Beginning Teacher Support Programs?

This program will differ in several important ways from other state programs aimed at supporting the induction of new teachers:

1. Most other programs provide for marginal, if any, involvement by universities. When universities are involved in support programs, this involvement typically is episodic, infrequent, and disconnected from the support provided by mentors. In contrast, this Tennessee program will provide support to mentors rather than directly to beginning teachers and seeks, thereby, to strengthen mentors and enhance the continuity, consistency and richness of the day-to-day lessons new teachers learn.

2. Most beginning teacner programs are not seen as integral parts of the effort to professionalize teaching. Typically, beginning teachers not only learn and unlearn lessons about teaching methods, they develop conceptions of teaching that significantly influence their definition of their roles and how they think about how they learn to improve their teaching. The program proposed here is seen as an essential step not only in the professional development of teachers but development of the profession of teaching.

3. This program is conceived of as a professional development opportunity for mentors as well as beginning teachers. It is anticipated that mentors involved in the program will provide leadership to their schools and school systems with respect to ways to enhance teacher effectiveness and professional roles.

4. This program is seen as a precursor of significant changes in the roles universities play in facilitating teacher learning. Most beginning teacher programs seek to play no role in the broader reform of teacher education or the improvement of schools. While this program can stand on its own as an innovation with the potential to influence policy and practice throughout the nation, it will also serve to further the realignment and future evolution of different roles for both universities and schools in supporting the professional development of teachers. As noted, this program could lead directly to the establishment of pilot Professional Development Schools.

TENNESSEE MENTORING SUPPORT PROGRAM